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DISCOURSES ON PRACTICAL PHYSIC.

I. ON PHYSICAL DISEASE FROM MENTAL STRAIN.
II. ON RESEARCH IN MEDICINE.
III. ON INTERMITTENT PULSE AND PALPITATION.

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BY

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PREFACE.

THE Discourses herewith presented to the reader were delivered on different occasions to audiences of medical men; the first to the members of the Psychological Association, the second to the St. Andrew's Medical Graduates' Association, the third, as now revised, to the Medical Society of London.

The Discourses are re-published in a separate volume simply because I have been often asked for them by members of the profession, both at home and abroad. They were to have appeared last year, but increasing professional work has hindered me in their production.

Such as they are I give them at last, and if they become in the smallest degree useful I am content.

B. W. R.

LONDON,
12, *Hinde Street, W.*,
Feby. 28*th*, 1871.

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ON PHYSICAL DISEASE FROM MENTAL STRAIN.

DISCOURSE I.

ON PHYSICAL DISEASE FROM MENTAL STRAIN.

In an address I had the honour to deliver before the St. Andrew's Medical Graduates Association in December, 1868, I took the opportunity briefly to direct the attention of those practitioners of medicine who are not specially engaged in the treatment of the insane, to the great importance of recognizing the influence of mental action on physical disease. I ventured to press the fact that the most scientific physicians have fallen into the error of studying, with too exclusive a care, the observable conditions of the body, healthy or diseased, and those agents or agencies for curing diseases which produce the most obvious effects—such as knives and other instruments, anæsthetic vapours, active drugs, heat and cold, electrical shocks, and the like. I admitted that as the pure physical existence is the groundwork and the primary necessity of the highest form of living thinking thing, it is by nature the first duty of the healer to make that corporeal frame pure and whole, but I insisted that it is equally his duty to study what shall enter by the senses or windows of the mind, and though invisibly entering, be potent forces for evil or for good. Because an agency is not visible, not tangible, is it, I asked, less real? If a man lose his mind by the loss of his blood, that, it is said, is plain to understand, for it is physical; but if some horror come upon the man through his mind, so that, like poor Horatio, he is be-chilled

> "Almost to jelly by the act of fear,
> Stands dumb, and speaks not,"

is not that, too, physical — an action direct of mind on matter, reversing the physics of the body, and creating disease? It must be so; and in the study of this action, from the universe into the man, lies a world almost unknown.

I argued further that charlatans of all kinds have, with strange acuteness, touched, without understanding it, this unknown world. They have played, it is said, on the credulity of man; they have done more; they have, in ignorance of what they were doing, reached the animal motion through the direct entrances by which the universal spirit enters also. I urged that the need for new contemplation in this direction increases with the intellectual development of the race; that the animal body, in order to maintain equality of power, and be the equal of the soul within it, must, in the course of the suns, be replaced by an organism more finely moulded, more accessible to the external beauty and harmony, more sensitive of pain, more sensible of weakness, less susceptible of maladies evidenced through matter, more susceptible of maladies evidenced through mind, and more impressionable to cure or to injury through the mind than through the baser body. And, lastly, I submitted that to study these changes of existence and action, to open this unknown world of natural truth, not to trade upon the knowledge of its existence, but to comprehend it with wisdom, are tasks to which the man of physic must either devote himself or retire with humiliation from one of the strongest holds in philosophy.

The subject thus glanced at in the address to which I have referred is the key note of the present effort. I am desirous to bring before those who are most conversant with the mental side of disease, the question I have opened, from its physical point of view, and to illustrate how in many and various ways the practice of medicine becomes a single and simple art and science in the hands of physicians who treat the disorders exhibited either through the phenomena of the mind or the body. This is my primary object, but there is another, hardly secondary. I am anxious also to put before the world at large the existence of certain physical social evils which are under perfect control, but which, developing with an increasing intelligence, are degrading the physical powers of our most powerful living men, and are interfering with the progressive development of powerful generations of men who should, or rather might, belong to the future.

Let me at once guard myself from any suspicion of a desire to exaggerate the evils of mental strain, by the remark that I have no idea of any evil from mental work when that is carried on with evenness and order and generalization. I take the brain to be the most enduring of organs—the organ that admits of most change, the organ that requires most change, the organ that is the most perfect repository of animal force and the most ready dispenser of it; the organ that can rest in parts when jaded, and work in parts that are not jaded at one and the same time. I look on mental work, and even on hard mental work, as conducive to health of life and length of days. I speak only of evils resulting from extreme strain or shock effecting mainly the grey matter of the cerebral structures; strain induced either by persistent and prolonged struggle, or by sudden and vehement shock conveyed by the senses and translated too urgently into conscious manifestation.

Subjects of Mental Strain.

Those who become subject to unfair mental influences from intense or prolonged strain belong to particular and easily defined classes of society. They are all mental workers, but as mental workers they constitute classes of themselves—classes distinguished by the character of work in which they move. I divide these classes into six.

First, there is the mere copyist, the man who sits all day at his desk, and transfers copies of writing, or of a speech, to a piece of paper. The clerk, the compositor, the reporter, and the second and third rate author are of this class.

Secondly, there is the thinker and writer, who copies also, but not directly from other writings, nor from thoughts expressed by other minds, but who goes to the great manuscripts of the Supreme Author—to the hills, and plains, and oceans, to the living kingdoms of all animals, and of all times, and translates the histories of these in written words, bringing the vastness of the universe, as seen by his superior sense, into moderate compass and legible form, so that lesser minds may read through him the truths he sees and unfolds.

Thirdly, there is the speculative man, usually very selfish and locked up in himself; who from day to day, and night to night, and hour to hour, *schemes;* who walks with his head down, his eyes on the earth, and thinks; thinks how he shall meet this obstacle, waylay that plan, shrewdly anticipate such and such event: a truly business man in the world's common acceptation.

Fourthly, there is the man who carries on his shoulders other people's anxieties, who thinks for others rather than for himself, and must never be tired by the effort: the professional man is here represented; the politician, the minister of religion, the physician and surgeon, the lawyer and the accountant.

Fifthly, there is the artist, who labours towards perfection in producing some given form—ideal or real—who, absorbed in his work, forgets the noisy crowd around him, and day after day toils on, living with his own creations, one in the world, but not of the world.

Lastly, there is the learner, the student; the child or youth whose will is hardly his own, who works when he is bidden, and plays when he is permitted; who is fed too often with flattery or blows, and between, or by one and the other, is at length turned out in life prepared, as it is thought, by education and training, to fight the great and unceasing battle of life.

Amongst these classes we meet with those who suffer mainly from the consequences of mental strain; but the injury is very unequally distributed. The copyist, who merely records the impressions he has received, and enters them direct on paper, is subject to little waste of force beyond that which is expended in muscular action, and his disorders are therefore confined chiefly to dyspepsia resulting from confinement at the desk, or from insufficient repose.

The second class of men, those who think as they write, suffer more determinately. With regard their work, however, I believe it need never be made injurious to the health of the body, and when it is varied and not compressed, it is one of the healthiest of occupations. The dangers to which men of letters are exposed, according to my observation, are two only: one the danger of rapid and intense thought with an impulse to chronicle instantly, and at any time, by night as by day what are called "happy conceptions;" the other the danger of writing against time, and of sustaining a readiness, at any moment, to write at any length, on any conceivable topic.

The third class of men, the speculators, are a more extreme class, and suffer exceptionally from mental strain. The man who during life has simply to beat down enemies as they appear, to take one up and another down, has hard work; but the speculator meets obstacles on all sides, and while he is winning in front, must often find himself held back by a strong hand in the rear. His life is to waylay, to calculate how he shall make up a book that shall win, come what will.

The absorption of this man's thoughts in his own plans and devices removes from him generally the idea of illness and of death. He differs from the man of ordinary business, in fact, in his insusceptibility to the necessities of his own physical existence. His life is surrounded with a kind of vulgar romance, and his own over-weening self-confidence, his consciousness that he either can or ought to devise schemes and calculations, which must or should carry the day, bear with them an enthusiasm which might well be devoted to a better cause. But by-and-by, in spite of himself, and in spite of the absorption, he begins to fail, and then the usual course is to resort to stimulants, by way of support. At last he suddenly breaks down; but buoyed up by constant hope of better days, he believes to the end that he shall recover, and retains his propensities with unflinching determination.

The ailments of the speculator are usually compound in character; for he is, in most cases, a man of active life, and the whole of his organism, muscular and nervous, is equally taxed. If he be a betting man, the race-course or some other out-door pursuit calls him into the open air. If he be a gambler, he is subjected to considerable muscular fatigue. Hence it follows that he is exposed to a variety of exhausting influences. His first symptoms usually commence with irregular action of the heart, and this is followed by results pertaining to a failure of that organ. In the majority of cases he succumbs, after exposure, to some sub-acute inflammatory disorder. He takes cold, suffers from congestion of the lungs or kidneys, and, unable to bear the shock, sinks rapidly under it, his mind becoming intensely irritable, or even losing its balance. Often he does some foolish thing, trips in his calculation, and is pronounced "insane."

The professional class of men stand amongst those who suffer most severely and decisively from what may be called simple exhaustion of the nervous system, resulting from active over-work. These differ from the other classes in most points. They differ from the original thinker in that they are neither closeted in the study nor intense in working out original designs. Learned in certain matters of fact and principles which the world at large does not comprehend, they are constantly putting their knowledge into practice on behalf of others, and seeing the faults, failings, and miseries of humanity, they become in time inured and ready for every surprise. They differ from the speculator in that they have, after a time, but little enthusiasm. They learn of the Preacher that "all things are alike to all;" they incline further with the same authority, that all things come alike to all; that "as it happeneth to the wise, even so to them; and they praise the dead which are already dead more than the living which are yet alive." Notwithstanding this, their philosophy fails them as their physical life advances. They suffer greatly from little annoyances connected with other men's concerns, and in the very fulness of their self-sacrifice —for of all men they least consider their own private concerns — they become morbidly sensitive to slights of every kind and more dissatisfied. Success, which in early time was the object of their life, brings with it terrible cares that are not unfrequently harder to bear than the worst failures. When they have made a position, they must maintain it at all risks; and having attained their rank, must sustain it despite time and labour. Add to these things this responsibility, that the labour done is for others and is open to the criticism of circles of people who knowing nothing of the difficulties, are consistent in the belief, that if they had had the management they could have done so much better,—and the picture is complete.

In the members of the professional class the brain is constantly being exercised without enthusiasm, and the body is daily being exercised without any sufficient rest. The result is that the excitement of brain which leads to insanity is exceedingly rare, and that those physical ailments which follow as secondary to the overworked brain become developed.

The professional class suffer largely, therefore, perhaps mainly, from physical affections. Diabetes, a physical nervous malady, is so common amongst them that I once had six gentlemen, following learned professions, under my care for this disease, at the same time; and for many years I have never been without one or more of such cases. Paralysis of the limbs, with little interference of the mental faculties, is another common type of disease. Affection of the kidneys, degeneration of the structure of those organs, is a third condition; and disorganisation of the structure of the heart is a last, and by no means rare, occurrence.

Men whose lives are devoted to the arts are infinitely less subjected to the graver physical evils than are either the professional men or the speculators. Their ailments, however, differ materially, according to the line of art which is pursued. Those who follow painting as an art, though they are sometimes for long hours shut up in the studio, and are working almost like men of letters, are nevertheless allowed recreations and pleasures which greatly relieve the monotony of their lives, and which add, in no small degree, to their health. They make their journeys to Rome, Venice, and various parts of England, and, indeed, lead an existence which is most invigorating and delightful. Exceptions must of course be made for those who suffer from pecuniary difficulties, who labour for the mere means of existence, and are obliged, in the studio, to conjure up subjects for the pencil from the worn out recollections of the past. But compared with the mass of mental workers these are very few, too few for any inference to be drawn or fact displayed as to their special diseases. Painters, as a whole, may indeed be considered as largely exempt from mental strain, but they have trials which tell upon the heart, in respect to the position which shall be gained by the work which they have done. I believe this is really the greatest mischief to which the painter is liable. His work is so light, so chaste, so fruitful of enjoyment, and so confined to those hours of the day when the sun shines, that he cannot seriously suffer from real over exertion. But for these very reasons, being retired from the world and understanding little of it, he chafes sorely under unjust criticism, and often frets himself into a nervous hesitating condition, which renders life a burden, prolonged, and hardly to be borne.

Concerning those who follow poetry as an art, we have heard much said—a vast deal more, I take it, than ever was true—as to their sufferings. In truth, the world has not produced a sufficient number of poets for us to calculate whether poetic art is at all destructive of mind or of body. The instances of destruction are too few and too questionable to be relied upon, and the romance which is made to surround destroyed poets is too extreme to be believed in by the physician.

The dramatic artist differs from the classes previously mentioned, both in his labours and in his troubles. To men of strong build and firm will, to men who possess by nature the very faculties which they represent, dramatic art may offer few anxieties or perils, and we know from experience that some of our greatest actors have passed through their active careers, extending over a long life, without suffering beyond other men; but if my experience serves me rightly, the majority of players are very differently placed. A man in the studio can labour at works of art calmly and quietly, thinking deliberately as he touches the inanimate canvas, of what can be said of the result. But this is very different from the art in which the man transforms his own body into art, and appears suddenly before a crowd, exhibiting himself in attitude and character personifying what he has never seen. To get up to this ordeal, the intensest labour and presence of mind are required, the strongest volition, the most refined ideal. We have an illustration of this intensity in those cases common, I believe, to almost every player—when the artist, at his first appearance, is said to be "stage struck," when for the moment the circulation stands still, when the muscles are rigid and the face deathly. That is the first, and probably the most painful ordeal, but it is an ordeal which rarely ceases altogether with the first appearance. Without manifesting itself with the same active symptoms as those that are combined at the stage struck period, it keeps alight a nervous irritable excitement, which intensifies up to the period when the time arrives for taking part in a performance, and then gradually subsides during the performance, or is even transformed into enthusiasm, to be followed, when the excitement is over, by a depression that may amount even to despair, a depression which applause and admiration do not satisfy, but which unjust or unfair criticism goads either into melancholy or apathy. Under these influences, many of our really best players sink into second or third positions, not because they are wanting in the talent to stand first, but for the simple reason that they prefer the ease of mediocrity. For this reason, some of our players who do stand first, owing to the constant irritation to which they are subjected, become cross, irritable, or desponding, finding no satisfaction in the temporary approbation which they achieve, but overwhelming chagrin at every shade of disappointment. Still more, in the very act of the sustaining of certain characters on the stage, vehement physical efforts are called forth, which demand a degree of muscular exertion, mental strain and expenditure of vital force altogether, of which the mere looker-on has no adequate conception. Take the play of "Othello," for instance, as indicating the character of the labour that is required of the actor. The mere effort of speaking such a play well is beyond the reach of ninety-nine men out of a hundred; but add to the speech the action, the studied expression, the passion,—what can be more onerous, exciting, or severe? In the intensity of the passion the brain is so tense it is as if it would distend the rigid skull, while all common surroundings are lost to view.

The labours of the players tell on the brain and the heart. The heart becomes irregular in its action; then, for a time, large and overstrong, and finally degenerate, feeble and uncertain. With this there are combined excessive timidity, sleeplessness, persistent dyspepsia, paralysis, and gradual decay. Whenever sensations thus excited lead the actor, unfortunately, to resort to the use of stimulants; when without a stimulant he is unable to meet his audience, or to recover from his labour, he is beginning to suffer from a second destruction, more fatal than the first.

The extent to which over mental strain is injurious to the young, varies according to the kind and character of work. The endeavour to fill the minds of children with artificial information leads to one of two results. Not unfrequently in the very young, it gives rise to direct disease of the brain itself, to deposit of tubercle if there be pre-disposition to that disease, to convulsive attacks, or even to epilepsy. In less extreme cases it causes simple weakness and exhaustion of the mental organs, with irregularity of power. The child may grow up with a memory taxed with technicals, and impressed so forcibly that it is hard to make way for other knowledge; and, added to these mischiefs there may be, and often is, the further evil, that the brain, owing to the labour put on it, becomes too fully and easily developed, too firm, and too soon mature, so that it remains throughout manhood always a large child's brain, very wonderful in a child, and equally ridiculous in a man or woman. The development in an excessive degree of one particular faculty is also a common cause of feebleness.

I knew once an instance in which a child was "blessed" with a marvellous gift of verbal memory. This being his "forte," his teacher, who wished every scholar to be remarkable for something beyond other scholars, played on this "forte" incessantly, and with wonderful effect. By constant cultivation of the one faculty this marvellous boy could learn off fifty lines of "Paradise Lost," or of any other English book at a single reading, and could repeat his lesson on the spot, without missing a word or omitting a comma. But the result was so bad that when the boy was sent from school to a university to learn a profession, he was beaten in the learning of detailed and detached facts by every fellow-student. Seeing slowly but surely where his weakness lay, the student ceased at last to call into play his remarkable talent. It was a terrible task; a task he accomplished at last to a considerable degree, but never effectually. For a long time he made mistakes that were most annoying; he was unable, for instance, to cast up accurately any column of figures, he forgot dates, he ran over or under important appointments, misnamed authors in speaking of works of art or letters, and in reasoning his want of analytical power was painfully felt. It took him full ten long years to unlearn his wonderful technical art.

For the reasons given I have always persistently opposed the special prize system in schools. A teacher, with some experience of results of teaching, I can recall no single instance in which noted prizemen *in early youth* bore away more than other men the prizes, that is to say, the successes, of after life. I have, however, many many times known the successful prizeman, in the class, the least successful afterwards, and as often have known the most ordinary youths, in class, come out as the best men in life.

Overwork in the child and in the student defeats its own object; it does not develop the powerful brain so necessary for the man: for life is ever a new and great lesson, and some young brain must be left free for the reception of lesson on lesson. Of this there need be no doubt, and there we may leave the first and leading fact. But the danger of overwork is, unfortunately, not confined to the brain, it extends to the body as a whole. When the brain is overworked in the growing child, however well the child may be fed, and clothed, and cared for, there will be overwaste of substance in proportion to the overwork. There will be stunted growth and the formation of a bad physical body.

In addition to mental strain induced in the manner suggested above, there is, as I hinted at first, strain from sudden shock, leading to consequences of the most serious character. I have sometimes had to determine whether extreme shock requires to be inflicted on feeble or over-sensitive persons, in order to strike effectively, and I have been drawn to the conclusion that such is unnecessary, and that the least emotional persons may be influenced. The after effects of sudden mental shocks have, however, been unstudied by that part of medicine which I represent, and I may, therefore, be speaking from too limited experience. Nevertheless, I am clear enough in the fact that I have seen physical evils follow upon mental shock in the most obtuse men.

Special Diseases from Mental Strain.

Diseases following upon mental shock or strain are divisible into two classes. There is a distinct class in which the mental shock stands out as the direct and only cause of the malady, and there is another class in which the mental shock or strain appears only to excite or to exaggerate symptoms of disease which pre-existed.

In the first class the diseases produced are the same as those which sometimes follow upon the receipt of physical injury to the nervous centres. I notice specially as the most perfect forms of disease of this nature, diabetes, paralysis (local or general), intermittent pulse, and arterial relaxation with arterial murmur.

Diabetes from sudden mental shock is a true type, a pure type, of a physical malady of mental origin. I have before me the notes of three cases, in which the first excretion of sugar and the profuse diuresis were symptoms as definedly sequential to severe mental strain, as when, in experiment on a lower animal, the malady is induced by inserting a needle into the brain in the region of the fourth ventricle. These cases constitute a hopeless class, the danger sudden, the course rapid, the fatal end sure.

The symptoms of paralysis from mental strain are usually less sudden in their approach, and are preceded by warnings, which, when noticed correctly, are sufficiently decisive. The most characteristic of these warnings is a sensation, on the part of the patient, of necessity during any mental effort for frequent rest and sleep; symptoms such as are described so faithfully, by Johnson, as belonging to the case of the Poet Collins. The course of these cases is usually clear; it is a progressive course towards general palsy of mind and body, and it is not unlike the decline of mental activity in the age of second childishness and mere oblivion. When this condition exists, at however early a stage, the slightest shock tells on the nervous structures, and transforms suddenly the threatening malady into the extreme reality. Sudden muscular paralysis is the most common sequence of shock, under this condition; it is in most cases, at first, a local paralysis; but it may, at once, become general in respect to all the muscular system which is under the control of the centres of volition.

Intermittent pulse is a physical symptom of cerebral and mental origin. I have never met with a case in which the disorder was not sequential to some anxiety; shock, fear, sorrow, or their similars. I have met with case upon case in which the sufferer has been able from his own perception of the intermittency to register the precise moment when the injury that caused it was inflicted. In all instances, when it is present, it is intensified by anxiety.

Arterial relaxation with murmur is the result of injury involving the emotional or organic nervous centres. I have seen it follow on direct physical injury, and I have seen it follow as distinctly on mental shock. It is a common result of intense grief, and is characterised by sudden changes of vascular tension, coldness, chills, frequent perspirations, irregular action of bowels, and, often, diuresis. But the most distressing symptom of all is the arterial murmur. This is usually heard by the patient, and is sometimes mistaken by the practitioner for aneurismal murmur. It is produced at those parts of the arterial tract where an artery runs through a rigid canal, as through the abdominal opening of the diaphagm, or the carotid canal in the base of the skull. In these rigid canals, the arteries being relaxed, the sides of the vessel press, with each impulse of the heart, on the surrounding resisting wall. Thus there is vibration and murmur, and in the case of vibration in the carotid canal the murmur is painfully audible to the patient. In these cases the symptoms are often developed in the most rapid manner, and recovery is equally as instantaneous.

It remains yet to be seen what physical change in the nervous centres is produced by sudden mental shock. The symptoms lead one to the idea that the change is identical with that which follows upon mechanical shock, or mechanical irritation; but what the nature of the change is has all to be learned. That it is some alteration in molecular arrangement, attended with change in form of matter, is the most reasonable theory ; but experiment is still wanting to indicate precisely the modification of structure which is induced.

The class of cases where nervous shock or strain excites latent, or intensifies actual symptoms, includes some chronic eruptions on the skin (psoriasis especially), cancer, epilepsy, and insanity itself. In all these there is some preceding condition, hereditary or acquired, which, by causing primary injury to the nervous structures, leads to a chronic exhaustion, easily intensified by the slightest shock. Thus the symptoms of tertiary syphilis will recur, on venereal excess, without any introduction of new venereal poison; thus eruption on the skin will follow upon nervous shock; thus cancer so frequently shows the first signs of its presence on mental anxiety; and in two cases of persons subject to epilepsy, the earliest seizure was clearly connected with mental prostration. Respecting insanity, I doubt whether it is ever the result of simple mental over-strain; on the contrary, I take it rather to be an upshot of extreme mental inactivity; but when the tendency to it is pronounced, then mental strain excites the malady.

The psychological physician is accustomed to look at mental as evolved from physical, or social, or transmitted causes, acting on the mind through the body. I have been trying to indicate, in the present effort, physical devastations as evolved from agencies acting on the body through the mind. I think I see the reverse side of a subject which has not often been discussed, the relation of mental to physical disease, and the picture thus presented is singularly instructive. It tells me that the origin of insanity, as a concrete fact, is rather to be sought for in inactivity, hereditary and individual inactivity of brain, than in exercise of brain; and that excessive exercise of brain is a cause not of mental, but of physical derangement. Our uneducated, cloddish populations are, in short, as I venture to assume, the breeders of our abstract insanity, while our educated, ambitious, over-straining, untiring, mental workers are the breeders and intensifiers of the worst types of physical disease.

ON RESEARCH IN MEDICINE.

DISCOURSE II.

ON RESEARCH IN MEDICINE.

The first necessity for medical research is a proper frame or constitution of mind. But this constitution, partly natural, partly acquired on a natural talent, is of such rarity it inevitably reduces to the smallest minority all who truly live, and who, when they are dead, command. So rare is it, indeed, that the twenty-three centuries from the Father of medicine have not brought forth twenty masters who, at this moment, are powerful to command. Hippocrates still holds out the natural history of disease; Paulus remains the foundation of surgery; Paracelsus keeps the crucible; Vesalius, as yet, is the general anatomist; Harvey retains his hand on the engine of the circulation; Willis is opening the skull case, and unrolling the brain; Mayow continues to teach that there is a furnace in the animal body burning by the air; Black and Priestly tell the nature of the combustion; Haller adds physics to physic, and Boerhaave scientific chemistry; Pinel puts the psychical upon the physical; John Hunter links the physiology of the inferior animal to that of the superior; Jenner stands out alone the revealer of a wholesale remedy; Humphrey Davy,—escaping from his nitrous oxide box, and exclaiming to Dr. Kinglake, "Nothing exists but thoughts; the universe is composed of impressions, ideas, pleasures, and pains—leads the beneficent advance of those who have abolished the horror of the surgeon's knife;

and Laennec, pronouncing a diagnostic on such safe physical basis as to leave no improvement on his principles, heads the last of the—

> "Tongues of our dead not lost,
> But speaking from death's frost
> Like fiery tongues at Pentecost."

To reach the height of these men, not one of whom was indebted to accident for his success, the constitution of mind is so exceptional that few are ever likely to approach it.

It is not difficult—nay, it is very easy, for a man to become a great performer in the art of physic, especially in the chirurgical part, and, thus excelling, to become justly famous. It is easy for a man to become erudite; it is comparatively easy for a man of ingenious mind to become a great theorist, and, by his speculations, to exist briefly after his death. Cullen, Darwin, and Brown are noted examples in this line. Lastly, by a spick and span method of ignoring fixed truths and inventing wild dogmas, it is the easiest of all things to gain a spurious fame, and even to live, as Hahneman has long lived, on the uplifted ignorance of the great illiterate.

But the medical science which truly advances comes from labour developed far differently from aught or any of these last-named qualities. It is a labour *sui generis*. The mind that yields it must have one primary attribute—*impassion*. If a single earthly object has to be served by the labour, and that be its design, assuredly the labour is damned forthwith. The mind must be fervid to the extreme of tension, and rather break than yield, or no clear and certain sound shall it pronounce. The mind to external friction must be smooth, relentless, impervious, otherwise impressions of fools may indent it and destroy its true nature. The mind, lastly, must be a mind within a mind, renewing itself, and correcting itself by the renewal, without any care as to its own past, or any care as to what shall seem, to smallness outside, its variability or inconsistency.

To die daily, that is the attribute of this mind; to be to-morrow what it was not to-day, and to admit the fact; to be firm always in work and object, to be obstinate never in question of result; to know and feel that no other criticism is, or can be, so severe and just as its own; to be ready to give up the choicest belief under conviction, but not to allow the sneers or opposition of the ignorant or half-learned to quicken doubt. To look on praise with due scepticism, and to hold to nothing wrongly because the delighted world calls *Sufficit.*

Such, according to my view, is the only frame and condition of mind through which medicine can advance in first principles of research.

I dwell on this view because, if it be true, it corrects a fundamental error in our systems everywhere. The accepted dogma is that medical science and art is to be advanced only by practice. Is that true? I entirely repudiate the dogma. That a man may practise and practise well, and at the same time advance the art on primary principles, is true; but his two progressions must be essentially distinct. Into that which he would advance by first principles no trace of worldly spirit must enter; pierced once in his nobler life by his lesser art, he is from that moment disabled; he is no longer a unit, but a section of a crowd.

Hence, I often fear lest, in the future, some of the great rewards of the deserving in medicine may come to those who live outside the pale;—who, impassionless, uninfluenced by the discords within, seeing the feebleness within too shrewdly, and scorning it, shall proceed alone and win, without care, by the development of truths which come only through serenity of observation.

This idea as to the men through whom science must rise direct from nature is supported by the great facts of history.

It is quite certain that in all the sciences which have risen to exactitude, the leaders of those sciences have been men who worked for exactitude, and with no other object in their advancing studies. They have sometimes been men who have followed particular occupations for the means of existence, and have turned the profits of their calling to their higher aim and work; but that higher work itself was pure. Thus our own Kepler, first great prince of astronomers, while he lived in his little black tent, and turned it into a camera, and anon practised medicine, was meanwhile making silently that divine, divine because pure, discovery of a common bond of suns and worlds, which, won at last, led him to exclaim, in the grandeur of inspiration:—"Nothing holds me. I will indulge my sacred fury! If you forgive me, I rejoice; if you are angry, I can bear it. The die is cast. The book is written, to be read either now, or by posterity, I care not which. It may well wait a century for a reader, since God has waited six thousand years for an observer."

In like manner, our Harvey, labouring out the problem of his life, dissevered the work from the routine of professional toil, and yielding to Sir Simon Baskerville the *éclat* of the successful practitioner, so called, was content to discover what Sir Simon, in his sublime practical wisdom, never knew, except, as to him, a useless mystery, *the circulation of the blood.*

Unity of Research.

After the frame and constitution of mind, the order of research comes before us for contemplation. And here, the first principle that requires to be recognised, is the principle of unity. At this moment, by the incoherent recognition of this unity, we are tearing our science to shreds, and hoping that, by combining the patchwork, we may produce a seamless garment. The conception is as feeble as it is motley. As the firmament is of one azure blue, as the heavens are in order, so the science that shall be perfect must be in harmony. Neither must our study be confined to one particular subject; it must extend to each science, and unite each one in the whole. From the rest of the science world, nothing should separate the Physician and Surgeon, except the art, which, in fact, is the craft-work of the science, developing it, but not producing. Shall one man be a mere physiologist, another man a mere pathologist, this a diagnostic, that a therapeutist? 'Tis trifling with nature. Test the matter by comparison. There is before us a mechanism, an engine which we have not invented, and the action of which we know not. To investigate it, to learn it in its unity, shall we divide ourselves into exclusive sections? Shall some discoverers take the engine to pieces, and figure each of its parts, its wheels and its pistons, its boiler and its condenser, its regulator and its tender? In truth, they shall do much. Shall others investigate the relations of these parts, their motion, their order of motion, the product? They shall also do much. Shall a third set examine the engine when out of gear, listen to its creakings, and grindings, and shakings, and look into its chambers and tubes, and valves, and feel its throbbings and heavings? They shall do much. Shall a fourth division take the useless engine and examine its disabled parts in detail, and describe them? They shall do much. Lastly, shall a set treating badly working engines, try to restore them by casting various fuels into the furnace, or by letting off steam, or cutting off excrescences, or patching up holes? They, too, shall do much; and, in mere handicraft, they shall, perchance, sometimes do a vast deal. In a word, all shall do well who labour in their respective callings thus far, and the division of labour shall be true, and the results natural, within their legitimate bounds.

But, if thus dividing ourselves into varied labour, we physicians allow the work we take in hand to isolate us from all other work; if we make one work predominate; if we give fashion to one department, and hold that up as the *beau idéal* of our study; if we make our divisions play the *rôle* of independent centres, then we advance not a jot—not a jot, but become the creatures, rulers, or subjects, of petty sovereignties, each alike poor, proud, and powerless; and, however so often the animal engine comes before us, sound or unsound, though it be before us under infinite variety of form every minute of our lives, and in a sense be the perpetual study of our lives, yet shall we, by the course we take, gain no more knowledge of the principle of the engine than the simple savage who contemplates a steam engine, with combined wonder, fear, admiration, and instinctive desire to know.

In physic, however, this divisional method of research, this centrifugal disintegration, is so much the passion that no man can be held learned who does not follow it. A man may be a great pathologist, a great physiologist, a great anatomist, a great diagnostician, a great microscopist, but a great physician he must not be; nay, after isolating his own greatness as widely as possible from other greatnesses, and after what he calls carving out for himself a speciality even in his own department, he will be content, flying, under the centrifugal propulsion, out of nature altogether, content to tell you that it is absurd, as, indeed, I fear it is for him, to try to master any subject save his own.

In the interests of science, in the interests of humanity, this centrifugal training and cultivation must really cease, if we, as a body, would stand a power; it is landing us breathless, companionless, naked, on the shores of folly, there to set up squalid huts and think ourselves kings. When a man, led by this propulsion, prides himself as I have heard a man pride himself, and his friends for him, that, pursuing his speciality with almost supernatural vigour, he has made so many thousands of minute dissections and measurements of one particular organ of the animal body, I may laugh at the conceit of the individual, but I must weep if I contemplate, solemnly, the terrible and chaotic imbecility of a system which allows such lost labour to pass for great labour, and which cheers the loss. If so simple a thing as a steam engine could never be learned off, as an engine, by such form of study, nor by any number of such isolated studies, how can it be expected that the unity of the animal machine can be advanced by research, in its case so infinitely less efficient?

I speak thus for the argument of science; I speak, feebly echoing the voice which proclaims everywhere the unity of nature, and the All-creative Intellect. But I am not unconscious that an argument from another side may be used against me, and which, on the principle of every man for himself, and heaven for us all, may be potently wielded. It may be urged that medical art and science, themselves of the earth earthy, must move with the earth as it is; that external influences, apart from them truly, but within the sphere of attraction, must tell upon them, and that, to succeed, they must conform to what may even be the prejudices of mankind. This stated, as a primary, it may further be urged that the whole tendency of the present day is to division of labour; that there is an earnest belief—fair or false it matters not—in favour of such a division, and that medicine to thrive must run in the current with the rest, and even at the risk of scientific dissolution must divide! divide! divide! Is it, indeed, so? Grant it, and medicine is in fragments which rub together, make noise, crash, and fall even to the lowest depth. Grant it, and where shall we limit the disintegration. Grant it, and how shall the world put on it any limitation, and why shall there not be as many classes of healers as there are organs, each healer having status according to the vital importance of the organ he treats. For my part, in humilia-

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tion, I admit the existence of this theory, but in the face of truth, I deny the necessity for it, or the wisdom of it. In thus bending to the sordid gravitation of the earth, there is a deformity in our art which, except in Egypt, when she was sinking, has seen no light until the last thirty or forty fleeting years. In these years, the Esculapian, forgetting his nobler part, has degraded himself to a common level, when he might have stood, in the earnest consciousness of his strength, above the level, and a first power in the land. Where, at the present time in this country, and in physic, is to be found the type of Richard Mead, who, in his palace, where little children now pour forth their touching woes, could command the friendship of every illustrious man who visited our shores? Where is now the Physician who dare say to the Prime Minister of England, liberate a just and upright man from the durance of the political prison, or my skill is in safe keeping from your frailty? Where is the representative of Haller, who shall claim, and claim to win, an equal place with the princes of philosophy? Where are the great teachers of Leyden, Padua, and London? Where are the men, who, like Harvey and Lower, in days when differences of rank were far more keenly appreciated than now, could call royal pupils to their noble demonstrations? Alas! I know not. I know only of a profession sinking fast its art into its trade, and in some, and many instances, descending even to the speculative tricks of the gambler, and to their inevitable consequences, loss of wealth, loss of mental health, and unmitigated despair.

Facilis descensus Averni, and never so facile as when the great descend.

That some one, if not I, should speak thus earnestly against the centrifugal rending of medicine, is the more necessary because of the risks of delay. It cannot be concealed that one generation imbued with a particular conceit, if it retain it to the last, passes it to the next generation with increasing force, and that many, indeed all, of the deepest sectional delusions have their root in the idola of descended usages and forms. A false belief, thus seated, evolves a practice of overwhelming power, because, despite the most cogent reasons against it, suggested and proved by better knowledge, men are afraid to question it or leave it. Thus, our forefathers in physic, by their too rigid adherence to wholesale blood-letting, against reason, allowed even the meanest of their enemies to prove them wrong with such a vengeance that in the revulsion of thought right and wrong fell together, and a grand remedy, in its true place, was as suddenly as childishly condemned and cast aside.

Amongst some classes of men, the retention of a prejudice engrafted of old, and belonging to many generations, may be of service, in that it may ensure the praise and confidence of a world able to judge of the merits of a mere idea or sentiment. Of the priest, the barrister, or the politician, the world may have a standard of judgment, and that judgment may have soundness in it, resting upon a correct understanding of a necessity or a talent. But of us, out of our moral and social relations, the world has no standard that is worth its possession or our appreciation. Our licenses to heal are its only safeguards, and these are governed by our own laws and opinions. In our practice we hear ourselves offensively criticised to-day, and to-morrow as offensively lauded; but by those of us who are serious in our work, the praise and blame are measured alike, because we know that our self-conscious mistakes are as often falsely admired as our self-conscious triumphs are falsely misrespresented. Who of us, that is observant, does not constantly witness the conceit that the last physician called in to give an opinion is the best in the eyes of the looker-on? Yet, who of us, that is honest, does not feel that the conceit is absurd, and, by common understanding, treat it for precisely what it is worth and no more?

But for these very reasons, for the reason of the helplessness of the world in judging of us, and the security of our own isolated position, we ought to guard the more jealously the unity of our science, and endeavour to become, not many men treading diverse paths, and aping before universal ignorance superiorities which we cannot substantiate before ourselves, but as one man treading the same path, and striving for such union of power as shall make all who will the best in all places, and in all time. Above everything, we ought not to permit a future Le Clerc, Sprengel, or Freind, to say of us, that in an age, crowded with every advantage, we forgot Hippocrates, and, bitten by the practices of inferior minds, turned our Temple into a market-place, each man with his own stall, and no stall with anything upon it the historian cares to discover.

By what steps shall we then progress towards that unity to which it is essential to aspire, towards that high standard of producing and fruitful research which shall put our work among the philosophies, and give us command and power. Proceeding to answer this question from its negative side, let me at once express an entire disbelief of the utility of spending time in putting down what is called quackery. Of course I do not mean that men who cultivate scientific medicine should associate with men of quackish mind and instinct, or that it is bad for us to do as we usually do, scent out with uncommon sharpness, all such representatives of the rat and weasel type, and send them to perpetual Coventry, with such marks on them as shall fix their positions and characters too firmly to admit of mistake. But I mean that it is in vain to enter into waste of controversy with systematised quackery, because, if we can make our science pure, there could be no quackery in existence, while there will be quackery so long as the science is impure. We see that in astronomy there are no quacks, that amongst skilled artisans there are no quacks;

and, turning to our own world, we know that even with us some parts of our field are entirely free of quacks. Who can find me a quack anatomist? Mark! as surgery has become more precise, how in surgery the quack has slunk aside. Where now is the quack woman who would venture, as in the time of good old Daniel Turner, to plunge a needle into the eye-ball to extract opaque bodies from its chambers. These errors have passed away, and so shall all quackeries pass as the certain takes the place of the doubtful or obscure. Respecting blatant quackery out of our sphere, I think we have every reason to be satisfied with its rapid decline; it has virtually ceased as a distinct and recognised trade, and in that character needs no more punishment. In our ranks, though it hides still, and, I veritably believe, exists often of necessity in the natural constitution of those who exhibit it, in men of small brain and cold blood, it is growing more harmless, day by day, under the influence of exposure, and its own idiotic feebleness.

Leaving then the negative side of the question, let us consider in what way our lines of research shall so be carried out that our united forces shall be brought into full and combined action.

And first, it appears to me, that such weakness as we show lies amongst those of us who represent the actual living fact of physic—lies in this, that we are walking separated from each other, on lines divergent so that we cannot meet, and so broadly apart that we do not even hail each other. We are as rays of light entering transparency, and yet not combining to form a focus, making no picture of such definition that the world can see a design in our combined action. If this be so, then the first step in our research must come from the active members of the profession, and must show itself by a resolution to arrest the present centrifugal aberration, to concentrate the forces, to consolidate the bases of our science.

In this sense, it is of first importance to forbid at once and for good the centrifugal mania of instituting a separate society for every artificially divided branch of medicine, and to prevent the molecular disintegration of the grand old Republic which our fathers left us to foster, to strengthen, to hold, to beautify, but never to dissever. It is not too late to amend this error. Let there be as many societies as there are tens to form them, if they all meet in the unity of physic; but the crash into sects, can no one stop that? Is there in medicine, and in this country, no central body that will attract the fragments and save anarchy? What should we say if the astronomers divided themselves into the telescopical society, the air-pump society, the solar society, the lunar society, the planetary society, the Saturn's ring society, the asteroid society, the fixed star society, the comet and meteor society, the star spectrum analysis society, the worlds-on-fire society; to say nothing of the Keplerian, the Newtonian, the Halleyan, or the zodiacal, ecliptic, or orbital societies? What should we say? Why that the astronomers were on their last wings—a mad crew, splitting up, as best they could, the blessed universe and the universal harmonies, for gross imaginings, with as little compunction as a printer who distributes the type of a great book, and making themselves as loose as sand.

The object of all societies, in short, should be simple union of men together for a common purpose, with independence of individual action and entire freedom from all that shall tend to specialise either men or things. When a man enters an arena, knowing that he will be allowed only to stand on one leg, he may, by the rehearsing he has been guilty of, and by the advantage of the trained and prepared tastes of the audience, make a very creditable display. But what belongs to the display or what comes of it? When a man, bound to a special society, is teamed with another man for a subspecial purpose, he may pull very hard and do all the work, or he may not pull at all; but in neither case will he be quite satisfied, and in neither case will the work have the breadth and touch, and colour of one skilful hand. Indeed, so formed are we by nature to differ, that the evolution of a single harmonious thought by two minds is a physical accident. The early Mythology, which gave to many gods the construction of the universe, was not intrinsically weaker, nor falser, nor more mischievous to the conception of order than are we at this moment. Let us, then, learn to respect in the fullest degree the absolute independency of mind. Let every man be a law unto himself. Let us seize, as truths, that all great progress is the result of individual labour, that genius has no double, and bears no double yoking; but that, fastened in their independency by the social ties of friendship, and sharpened by the criticism of other minds, the units of the profession of medicine may each become so strong that their very individuality shall be their safest bond, and their independent strength the best surety of their united endurance.

Unity of Practice.

To secure a sound method of research in medicine, unity of practice, and of observation over the whole field of disease, is another essential. I am quite free to admit that men have certain differences of capacity and feeling which education cannot at all equalise; and I also see that, in our great work, there are practically a few grand parts which, though, not altogether, nor, indeed, at all disconnected, do, nevertheless, allow scope for certain differences of capacity and power. The governance of the hand and the eye for precise co-operation is natural in some men, and when this gift is combined with a firm heart, the man, owning all, stands forward, pre-eminently qualified for the handicraft of Physic. He is, by nature, a Surgeon, and although he may likewise be a good

Physician, he will soon be detected as having the mechanical art at his fingers' ends. There are other men who are naturally endowed with perceptive knowledge of habits, tastes, and feelings, mental or physical. These men are, by nature, Physicians, and though they may likewise become good Surgeons, they are soon read off and placed by their compeers in their true positions.

Corresponding with these natural qualities of professors of our art, there are tracks in the art itself for peculiar skill, and the general division of medicine into the medical and the surgical, is probably a sound practice, resting on necessity and on natural law. A plea also may be put in with fairness, founded exclusively, however, on artificial necessity, peculiar to the age and civilisation, for the separation of the Physicians into those who treat physical, and those who treat mental disease. But beyond these general divisions, there can be no rending for anything but evil. Separate an organ from an organism, and the organ no longer belongs to the organism. Make diseases isolations, and you make them entities, to be treated as such. What child's play! If the theory, hapless, were true, what hope were there for advance in knowledge of disease or its management? Entities, how many are you? Physicians, on what is your particular knowledge of your particular entity based? Can you separate one of your entities, or find an exclusive seat for it in the vile body? Well, if you can, then has your labour not commenced, for entities never die, and although you may live long to study yours, and to make the description of it sensational, and to talk to it and get many fees for the talking, which fees shall be, after all, the best of the intercourse, yet shall the entity remain unexorcised, and lively as ever, when you are very quiet indeed.

The entity doctrine in physic, having its origin in the dreams of Van Helmont and Stahl, dreams grossly perverted by their followers, and carried down to this day in reality, although disguised in some of the stolen clothes of science, is the curse of our profession. When the public comes to form so low an estimate of an individual who should rank with the philosopher, as to believe that his knowledge is confined to one so-called disease, or to one organ, the beauty and the nobility of medicine, as a system, are for the moment gone, and the great philosophy which the ancient poets compared to the sun, and consigned symbolically to Apollo, is eclipsed. And when he, who should be the philosopher, is willing to bow to so mean an estimate, and to say, "Your servant, sir," to the stupid who comes to him because he is considered the fountain head of knowledge on the kidney, the liver, the toe nail, or the muscles and sinews as distinguished from the bones and the joints, then is the eclipse dense of dense. The darkness may be felt.

Nothing but a sense of an imperative duty could warrant these sayings. Nothing, except the deepest love for medicine, could embolden me to say them. But I am tired of seing physic sneered at as the least exact of all human knowledge. I am wearied with the everlasting sound of the earth bells tolling our frailties; and I am saddened to recognise that the profession, blind to its interests, allows an universal specialism to nourish and force an almost universal scepticism.

Unity of Education.

To sustain the principle of unity of research in medicine, a reform of the most sweeping character is required in the matter of medical education. The young mind, brought for the first time into connection with its older life, takes up at once the impressions by which it shall afterwards be mostly guided and ruled. What then sees the student as he enters medicine? What does he hear? What does he grasp? He sees a mirage, he hears a Babel, he grasps water.

What of the hundred things set before him to study shall he study first? Which one of all those debaters, for now there are no teachers, shall he believe? To what tenet, to what current shall he trust his future? Poor Student! thou hast many masters, but no master; and now thy masters, abusing with loud sounds, the scissor workers of physic out of the privileged house which thou walkest in, are so far imitating the same as to snip up for thee, even in that privileged house, sundry similar patterns, which thou must also learn. I do not wish to over praise the old days of apprenticeship, and seven years' surgery. But, beshrew me, Student,—skipping about in that big asylum, now in this lecture room half asleep, and anon in that lecture room very much too wide awake; this hour pouring out thy broken ideas on that operation, criticising Peter thy master, at the expense of Paul thy master, and finishing up the day with a discussion at a society's meeting, on a subject, the alphabet of which is not thy possession,—beshrew me, Student, if perchance thou wert not better off in the seven years' surgery after all, and vastly better if there thou hadst over thee one good master, who would give thee all he has, except experience, and years, and ripeness of thought, and thine own soul.

Unity in medical teaching is a call urgent and unmistakable. As many schools as you may find teachers for them, as much rivalry as you please, but unity in the school, unity of thought, unity of word, unity of expectation and object, these are the urgent demands of the day and the hour.

Neither are the demands on the side, and in the interests, of the taught alone; they extend to the teacher. The art, the skill, the endurance, the fame of the teacher, are all in galloping decline. On the one hand, so keen is the competition for practice, so much richer are its rewards; on the other hand, so widely distributed are the responsibilities of the teacher, and so small is the return for skilled and profound teaching, that there is no practical competition whatever for professorial fame. Before he is himself schooled in schooling, your modern Lecturer is out of the chair and into the chariot; and thus we are accustomed to hear of the various schools that "the school is of no moment," that "one school is as good as another," and that everything in the way of success rests with the Student. The argument is irresistible, but is it good that it should be irresistible? Is there nothing for the student to learn in the patience, the impassion, the solidity, the labour, the zeal, the devotion of a great teacher? Was Fabricius nothing to Harvey? Was Beddoes nothing to Davy? Was William Hunter nothing to Brother John? Let the eloquence, the genius, the force of the great teachers of old pass into the grave, and the dead have buried their dead, and the living have no more life.

The Direction of Research.

Presuming the centrifugal system of modern medicine be abandoned, or so modified as to lead us to some common understanding, what are the directions towards the unity of which I have spoken? The first step is to bring all minds to bear on the simple physical relations of animal force to animal matter. In animal bodies I find two different forms of matter, one I call fatty matter, the other I call albuminous. I take the fat, which is a solid, I apply to it force, by the heat of a lamp or fire, and from the solid it becomes of fluid form. I take the albumen, which is before me liquid, in water; I apply to it the same force, and lo! the liquid becomes solid. I take a dead animal, and expose it, directly after death, to a temperature from five to six degrees above freezing point, and its fat solidifies, but its muscles remain flaccid. I take another animal recently dead, and place it on a sand bath at 110°, and its fatty matter remains fluid, but its muscles contract and fix in the firmest rigidity. I take blood, newly drawn and fluid; I place it below 44°, and it holds as a fluid; I raise the temperature only ten degrees, and it yields me a firm coagulum. I take gelatine, a solid, like dried and coagulated fibrine, treat it with heated water, and it dissolves, into what resembles water itself in tenuity, to solidify again as it cools. What mean these opposite effects of the same force? How does the force bind one thing and loosen the other? Why in the organs of active locomotion have we only matter that is put into contraction by force, while in the nerve tissue we have compound matter, one part of which is solidified, the other fluidified, by force? How is force laid up in nervous matter? Why, in one case is it fatally poured out, and in another case fatally suppressed? These, and many more questions of the same caste, lie at the root of the explanation of living phenomena healthy and diseased; nor can a step be made in scientific healing until they are answered. With the relations of force to matter unknown, the morbid dissector, like the grave-stone carver, cuts merely to record, the pathologist is an abstraction, while the therapeutist is a sceptical believer, who fears to trust, dares not mistrust, and relies on an experience which varies like the deceitful sea.

The simple relations of force to matter understood, all that requires to be known by the physician, in every department, would proceed as light proceeds from the sun. He would see phenomena as natural and sequential, and what now appears to him out of the order of nature and as disease, so named in abhorrence or disgust, would be found to be in order and to be preventable, remediable, or removable, according to the necessities of order. Then would he see and understand the limitations of his power, nor waste his time in what, for aught he knows now, may be vain efforts to resist the inevitable. Then would he understand the full extent of his influence, and gather, I predict, such marvels of knowledge that the crude beliefs of the wondering world should be shaken to their centre.

But towards this end the cry is again for the unity of research. As none but the God can love from "whole to parts," as no service, nor labour, nor work of man hath ever descended from the whole to the parts, but hath always proceeded from the individual to the whole, when success hath attended it; so, in medicine, we must move from the primary facts of life to the whole manifestation.

And here will be the point of the conversion of medicine from dissolute and prodigal weakness into absolute and united strength, that her wandering children, ceasing, in sheer and useless weariness, from their isolated tasks, and called by the trumpet voice of some great leader, shall lend themselves manfully to the discovery of primary truth, and, from that discovery, march on in the consciousness that the accepted is the proved, and that what is not proved is not known.

In the midst of much confusion, and, as I have shown, of fearful centrifugal rending, there stand forth two facts of promise.

I notice, first, that there are one or two stranger voices whose words are reaching us. Amongst these the voice of Thomas Graham, Master of her Majesty's Mint, is specially attracting us. His language is strange to many, but there are single notes, and I had almost said harmonies, which come with power upon the mind. He will be listened to more.*

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* Since this address was delivered the world of science has, alas! had to deplore the loss of this illustrious master. His researches on osmosis, and on the division

I notice, secondly, that there is almost a thankful willingness to resign Abra-ca-da-bra! We had for a long time a book of common forms; a Latin book, in Rose, Shamrock, and Thistle editions, full of strange tales,

> "Of herbs, plants, flowers, and their true qualities,"

writ in Latin. At last the strongest man in the practical reform of our craft in our time—the Cromwell of physic—condemned the book and its mysteries, and now it floats, in simple English dress, preparing to make its bow and retire altogether. Before I name the book, I must in parenthesis, say who this strong man was. It was the man who, opening the locked doors of hospitals, nailed them open, and who left behind him a work which—though its blasts and its hurricanes are subdued, though its noble Saxon tongue, ringing like the hammer of Thor on an anvil of silver, hath caught the Norman lisp, and though the hand of the poet, born, not made, moves in it no more—is, notwithstanding, under the momentum of his genius, still one of the most powerful class-journals in the world. The man I mean was the late Mr. Wakley.

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of natural substances into two great classes, called respectively colloids and crystalloids, are of pre-eminent service to the physiologist and pathologist, and in time will be taken into consideration in the study of all those actions and functions of living things which are commonly distinguished as "vital." I have myself, in one line of research, endeavoured to utilize the discoveries of Graham on osmotic force, and, I trust, with success. I refer to the researches on the synthesis of cataract, in which, following up the admirable and original observation of Dr. Weir Mitchell, of Philadelphia, I discovered that, with one or two rare exceptions, all soluble crystalloidal substances will produce temporary opacity (cataract) of the crystalline lens, if introduced in excess into animal bodies. But even the researches of the late Master of the Mint on osmosis are not more important to the world of scientific medicine than are his earlier labours on the diffusion of gases. Since we, as physicians, have come practically to apply gases and vapours as medicines, by inhalation, we have become more determinately physicists, to whom the perfect physical lessons of Graham on diffusion are simply essential as matters to be learned, if we would connect precision with our work, and leave empiricism and doubt for the sake of induction and positive science.

As for the book which he condemned, and which flourishes in this day as the "British Pharmacopeia," though the reform in it is not stout winning, it is a good giving-up of dead weight, and amidst an ocean of discouragement, is a faint but hopeful sign of advancement. It is beyond what it seems. It is leading us to ask whether simplification cannot be carried out further, and whether investigation as to remedies cannot be rendered more precise; it affords scope for the introduction of principles in therapeutics, and, binding us by a more correct nomenclature with advanced chemistry, it connects us closely with one section, at least, of the more accurate sciences.

The Ultimate Object.

Hitherto I have spoken of research in medicine as connected with our present interests and aspirations; but the grand, the overpowering object of such research rests, after all, in the hopes of the future. Who fails to realise this truth hath nor part nor lot in victory. If the unity of belief, that we live for the future, exist not amongst us, but be left to the prescience of individual minds, then is unity of labour still far, far removed, and the mourning of the world wailingly prolonged. Small, comparatively, we may be, but if the world waits for our combined action, then ought we to be absolutely great. And who dares doubt that the world doth anxiously wait, even for us?

The glories of that happier time, for which all creation yearns, what are they but the glories of life relieved from pain, from want, from care? Are not these reliefs our duties? Is it not our office to be the first of men to pluck the curse of pain from the whole earth? Is it not our office to economise the gifts of nature, and lend her wealth to health? Is it not our office to soothe the troubled mind, and bring the disturbed brain to equilibrium of power? If these be not our offices, who are the blessed that claim them? If they be, then the sweetest singer of Israel, telling of the time when "There shall be no more thence an infant of days, nor an old man that hath not filled his days;" and the Roman poet singing the—

> "*Ultima Cumæi venit jam carminis ætas,*
> *Magnus ab integro sæclorum nascitur ordo;*"

and the mighty apostle, thundering through the ages, "The last enemy that shall be destroyed is death."—Then these are our prophets, proclaiming to us our mission, and assuring us that if the mission be faithful, and their prophetic visions true, we, in life or in death, shall be as kings in the kingdom of Our Father.

ON INTERMITTENT PULSE & PALPITATION.

DISCOURSE III.

ON INTERMITTENT PULSE & PALPITATION.

CHAPTER I.

DEFINITION OF INTERMITTENT PULSE.—PHYSICAL CHARACTER.

Definition of Intermittent Pulse.

In relation to time there are in disease three distinct variations in the beat of the pulse.

(1) There is a beat which may be called an *acute irregularity*, in which each stroke is given in correct order of succession the one stroke to the other, but in series of five, ten, or other number of beats differing in rate from other series. In cases of very feeble heart we often meet this condition, we meet it in anæmia, we meet it after loss of blood and other serious states of depression.

(2) There is a beat which may be called a *prolonged irregularity*, in which the pulse shall during one minute register say seventy, and if counted through a succeeding minute, ninety or a hundred beats. This form of irregularity, in relation to time, is met with most distinctively in cases of acute cerebral disease, especially in the hydrocephalus of children. In hydrocephalus, according to my experience, it is a fatal sign; I have never known an instance of recovery, when, with other acute symptoms pointing to the brain as the seat of the acute disease, this prolonged irregularity has been markedly present.

(3) Lastly, there is the kind of irregularity which is to be studied in the present essay—the irregularity known to us all, and known to many of the intelligent public, by the term *intermittency*, and connected often by the patient with the further definition *palpitation*. This irregularity consists of an absolute loss of certain of the normal beats of the pulse; it is as though the pulse were clipped out for the moment, the intermittency of stroke occurring during the whole interval of a normal stroke, or in extreme cases covering the time of two, three, or even a greater number of natural pulsations.

Three years ago I brought forward these subjects of Intermittent Pulse and Palpitation as one of the lectures in my course of Experimental and Practical Medicine. The phenomenon of intermittency in the pulse stroke of the heart had then been under my observation for many years, and on the facts relating to it, thus learned clinically in the first instance, the lecture was based. It was not however until after the lecture was published that I was conversant of the practical interest which the profession took in the question discussed; and indeed I am in doubt whether any paper I have ever written has, on the whole, created a keener interest. In brief, I struck upon a subject with which all practitioners were acquainted, but respecting which little had either been written or spoken; thus there was excited a general desire and curiosity to receive, even as a novelty, an old and familiar study.

Since the time when the lecture became known in the profession a very large number of cases of intermittent pulse have been brought under my notice. I have consequently been able to re-learn the subject from a position extremely favourable for the labour, and as it embraces many questions of importance relating to physiology and practice, I venture now to revise what I have previously written, and to add such new facts as have been presented to my mind.

Physical Character of Intermittent Pulse.

If we turn to the heart to tell us what is the reason of the hesitation of the pulse when it intermits, we discover readily enough that the gap is due to a break or holding back of the ventricular systole. We listen for the heart sounds, the *Lŭb dúp*, followed by the *pause*, and all goes on correctly a given number of times, when suddenly there is, as it were, a revulsion—I know no better term—and with that the hesitation in the arterial beat. We wait for a return of the phenomenon, we analyse it carefully, and we read that it is connected with an entire absence of the first or long cardiac sound, with a very faint second sound, and with loss of the pulse, followed usually by a heavy thud of a returning first sound, by two sharp and distinct but faint quick second sounds, and by return of the pulse

We infer from this reading what has happened in the cardiac mechanism; we infer that the left ventricle, at all events, has, for a moment, failed to contract on its contents, the blood within it. Thus, the column of blood which has been always left in the arteries waiting for ventricular impulse has been reduced passively by mere arterial contraction, and the pulse has been lost, because there has been no wave projected along the artery from the heart. Following on the second of the two succeeding diastolic sounds, the pulse returns; the revived systolic contraction, having first re-supplied the arteries, overcomes arterial tension and reproduces the pulse wave.

It seems difficult at first to account for the two rapid diastolic sounds which follow one upon the other. At one time I thought the double diastolic sound, the quick *dúp dúp*, was due to the circumstance that at the moment of intermittency the left ventricle of the heart alone fails to contract, and that the double returning second sound is produced by a separate, instead of a simultaneous, closing of the pulmonary semilunar and aortic semilunar valves, the pulmonary valves continuing to act in their proper order, and closing twice in the same time that the aortic valves close once, until the simultaneous action is restored. I am, however, induced, by further research, to believe that this view does not quite correctly explain or define what really occurs, and I therefore beg to offer a revision of the subject in a separate chapter.

CHAPTER II.

CAUSE OF INTERMITTENT PULSE, MECHANICAL AND ORGANIC.

Mechanical Cause of Intermittent Pulse.

When we write the sounds down in order, before, during, and after an intermittent act, thus—

Natural.	Ventricular intermittency with loss of pulse.	Returning long ventricular systole with return of pulse.	Natural.
Lūb dùp 0	0 dúp 0	Lūb dúp dúp	Lūb dúp 0

the phenomenon of intermittency is seen clearly enough, I think, as dependent on failure of the action, I will say first, of the left ventricle. In what does that failure consist? Does the ventricle not contract, or does it contract and find no blood upon which to close? The evidence on this point is very sound. It goes at once to show that the ventricle does not contract; if there were no blood in the ventricle, there must be blood in excess in the pulmonary circuit and in a hugely distended auricle, of which conditions we have no indications whatever. That is the negative side; but there is positive, almost speaking, evidence of what has occurred in the long thud of the returning systolic sound which proclaims the ventricle again at its work, and which tells that it is contracting on a more than ordinary volume of blood within its cavity. If these evidences, then, be true, the intermittency of the arterial pulse occurs from an independent failure of action of the left ventricle of the heart. The ventricle continues in diastole for two or more strokes of the systole of its auricle, and then relieves itself by a prolonged effort; it is like a smith who, striking at the forge a number of strokes in rhythmical succession until tired, changes the action for a moment to give a more deliberate and determinate blow, and then rings on again in regular time.

This no doubt is true in relation to the left ventricle, but is the failure confined to the left ventricle as originally assumed, or do both right and left ventricles fail? I am now of opinion that both ventricles fail, and that the order of change from the natural through the unnatural and again to the natural is as follows.

The ventricles, filled by the systole of the auricles, fail to contract on the blood contained in them; thus the system altogether is left with the arterial side of the heart full, with the arteries contracted on a small column of blood, with the veins full, and with the right side of the heart full both in auricle and ventricle. In a word, the whole circulating system is left containing blood, so that the line of the blood current continues unbroken. During the interval of the cessation of the action of the ventricles, blood is, moreover, still entering the right auricle from the two cavæ, by that continuous force which the older writers called the *vis a fronte*, and the auricle remains in motion, contracting on its contained blood. A column of blood is in this way still carried into the pulmonary artery, and, the artery contracting, a feeble second sound is produced, after the loss of the systolic sound, by the closure of the pulmonary semilunar valves. Lastly, when the ventricles again contract, contracting as they do at this time on a double charge of blood, there is produced the long heavy systolic sound, followed by the two sharp faint second sounds, the reduplication of the second sound being due either to a separate closure of the pulmonary and aortic sets of valves, or to a simultaneous double but feeble closure of both.

Organic Cause of Intermittent Pulse.

In the above explanations I have dealt simply with the mechanical cause of the abnormal phenomenon of intermittency of the pulse. Now arises the question—what is the more elementary, the organic, cause? Let us study this question by the process of exclusion.

We should naturally begin by looking into the structure of the heart for a cause. We should be wrong. The fact alone that during the intervening periods of intermittency the heart is natural in its action, would go far to indicate that in it there need be no serious organic lesion. Still, this of itself would be little were it unsupported by more direct evidence. Being greatly interested in this matter, I seized once the opportunity of examining after death the heart of an aged man, who for many years presented the phenomenon of intermittency more determinately than I ever before had seen; his pulse, never, as far as I could learn, failed to intermit less often than once in eight beats. His death was from senile decay, but his circulation may be said to have outlived all the other of his systemic powers. When quite insensible, the pulse with long hesitations, came up again, and the pulse was beating at the end, even when the respiration had ceased. After death, instead of a diseased heart, the heart was found the healthiest of the organs of the body. There was no trace of valvular disease. There was no departure from the natural size and condition of the cavities or the thicknesses of the walls; the coronary arteries were normal, and the muscular structure, quite free from fatty and granular degeneracy, was merely, as the tissues are in the aged, a shade paler than is common in the young and robust. Since the occurrence of that case, I have confirmed the experience then gained by three other experiences. I feel bound, therefore, to say, from what I have seen, as positive truth, that the most marked intermittency of the heart may be present without evidence of any known form of organic disease of the organ itself; and, as one fact carefully assured is as good as a thousand, I am driven to accept that there is no known morbid condition of the heart itself, structurally considered, that produces the phenomenon of intermittent action. Intermittency may co-exist with other signs of cardiac derangement essentially of structural origin; a fatty heart may intermit; a heart with faulty valvular mechanism may intermit; and intermittency with structural change may form, and often does form, a most serious complication. These facts we must at once allow, but we must allow them feeling that the intermittent action, having no necessary connection with the structural disorder, is evoked by a cause remote and independent. Pre-existent diseases of a special kind, such as acute rheumatism, do not, so far as I can learn, leave intermittency specially in their train; neither, as far as I know, is the phenomenon more common in those who have structural disease of the heart than in those who have not.

From the study of the heart itself we may turn naturally to the digestive system, and ask if there can be any cause for the symptom in functional or organic disease there? May not the symptom, that is to say, be due to some one of the many forms of dyspepsia? On this point my observations lead me to assume that intermittency of the heart has no relation to what is commonly called "dyspepsia." It is true that many dyspeptic persons have intermittent pulse, but this fact does not affect the question, because it is equally true that many persons who have determinate intermittency of pulse have the most keen and excellent digestion. I have a patient at this very time whose case is strictly in point: his pulse intermits every sixteenth beat, but his tongue is clean, his urine natural, his appetite good, his sleep sound, and his bowels regular. After taking food he has no pain, he has no flatulency, and, according to his own often repeated expression, "he does not know that he has a stomach." On the other hand, we constantly see dyspepsia in all its varied and severe forms without the sign of intermittency.

In publishing for the first time on this subject I held, as above, that dyspepsia has no necessary relation to the prime cause of intermittency, and although Dr. Leared and some other learned friends, for whose opinion I have the greatest regard, have disputed the position, I am forced to re-affirm it. I admit that many persons who are dyspeptic have intermittency of the pulse, and I believe there are cases in which dyspepsia itself is due to some similar cause as that which is at work to induce intermittent action; so that the two symptoms running together, the one, unless the analysis be searching, may seem to stand in relation either of cause or of effect to the other, whereas they are simply co-incident symptoms. Further, I am quite willing to allow that in persons who have what may be correctly called "recurring intermittency," the recurrence may, and indeed often does, present itself with symptoms of dyspepsia. Further still, it is I think possible that in those who are disposed to intermittent pulse, an attack of dyspepsia may, by the irritation and deprivation of general power which it induces, aggravate the symptom of intermittency. But this is the position I accept, nature leading me to it,—that amongst the large number of persons who have intermittent pulse none owe it simply to dyspepsia; that its cause lies beyond dyspepsia even in the dyspeptic, and that it may be present in its most aggravated form when dyspepsia does not exist at all.

I know of no diseased condition of the blood with which the phenomenon of intermittency is connected. Neither have I been able, after careful research, to trace it, in the light of effect from cause, to any affection of the lung, the liver, the kidney, or other secreting or excreting organ.

Thus we are driven at last to one sole system of the body in which to seek for the origin of the phenomenon of intermittency of the heart; and that is the nervous system. Followed to this seat, all the evidence is too unequivocal to be doubted. The frequent sudden development of the phenomenon, its purely functional character, in so far as the heart is concerned, and the other symptoms by which it is attended, leave no room to question the correctness of the view that the momentary cessation of the ventricular systole occurs from deprivation of or opposition to the nervous force by which the ventricles are enabled, under the stimulus of the blood thrown into them by the auricles, to contract upon and regulate the blood currents in their course.

All the evidences, again, point to the fact that, in every case of true intermittency, one particular point or centre of the nervous system is the primary seat of the derangement. The phenomenon is too uniform to admit of any explanation less definite; it speaks to us and says that either there is deficiency of force in the centre of the nervous system which provides for ventricular contraction, or there is some centre which balances or controls that supplying centre, and which, rendered overactive from irritation, is interfering with contraction.

The derangement might be in the ganglionic centres of the heart itself; but if it were, the nutrition of the organ would surely be more decidedly influenced, and the cardiac symptoms would not be intermittent, but persistent. The derangement might be from irritation in the periphery or in the branches of the pneumogastric; but if it were, it would hardly be continuous for years, with no other sign of muscular disturbance. Where then is the primary mischief? I believe it to be in some mental centre of the nervous system. The clinical history of every case I have seen points to that truth. In the aged, intermittency is an almost invariable follower of failing power; in the very young, it presents itself with other indications of mental derangement or feebleness. But that which impresses me most in favour of this origin of intermittent pulse is the mode in which it appears in the prime of life. I have never met with a case in which it has not been traceable to some form of mental excitement with succeeding depression. Grief imposed by the deaths of relatives and friends, shock from failures of enterprises in business; disappointments, violent outbursts of passion, remorse, degradation, and, most fruitful cause of all in this madly striving age, over-work and worry, these are the outside influences leading to the systemic change on which the phenomenon of intermittency of the pulse depends.

In my original essay I expressed these same views, and my experience during the last three years, an experience quite exceptional, has strengthened them in every particular. In no case, except where the symptom has belonged merely to old age, have I failed to trace the disease back to what may be called mental shock, and in many instances the patients have themselves described to me the first occurrence of the symptom as derived from their own immediate knowledge. In the next chapter I have given a few illustrations of mode of origen of intermittent action.

CHAPTER III.

ILLUSTRATIONS OF ORIGIN OF INTERMITTENT PULSE.

Intermittent Pulse Induced by Terror of Sudden Death during Shipwreck.

A gentleman of middle age was returning home from a long voyage in the most perfect health and spirits, when the vessel in which he was sailing was struck by a larger one, and, hopelessly injured, began to sink. With the sensation of the sinking of the ship and the obvious imminence of death—five minutes was the longest expected period of remaining life—this gentleman felt his heart, previously acting vehemently, stop in its beat. He remembered then a confused period of noise and cries and rush, and a return to comparative quiet, when he discovered himself being conveyed almost unconsciously out of the sinking vessel, and on to the deck of another vessel that had rendered assistance. When he had gained sufficient calmness he found that the periods of intermittent action of his heart could be counted. They occurred four or five times in the minute for several days, and interfered with his going to sleep for many nights. On landing the intermittency decreased, and when the patient soon afterwards came to me there were not more than two intermittent strokes in the minute, all the intervening strokes being entirely natural, and the action of the heart and the sounds of it being simply perfect. In this gentleman the intermittent pulse became a fixed condition, but so modified in character that it was endurable. At his last visit to me he was not conscious of the symptom except he took it objectively from himself, by feeling his own pulse or listening to his own heart.

Intermittent Pulse from Anxiety.

One of the extremest cases of intermittency of pulse I have yet seen was in the person of a member of one of the learned professions, who, by an innocent, but in his case imprudent act, brought himself under ecclesiastical censure. The result was his removal from his position, and indeed from his profession, and during the anxiety, and as he felt unmerited disgrace which followed, the intermittent motion of his heart was developed. In this instance the mischief continued until at length it was an ever conscious fact to the sufferer, and for months prevented anything like natural sleep. He could not lie down, lest the heart should stop altogether, and though I and two medical friends did all in our power to give rest, we could never restore the balance of natural action. In this instance the persistent intermittency, and the silent but terrible and sleepless suffering it produced, caused gradual failure of power and death.

Intermittent Pulse from Grief.

Grief, especially when it is combined with exhaustion of the body, is a very common cause of intermittent pulse.

(1) A young woman, an out-patient at a public hospital to which I was formerly attached as physician, came before me with an intermittency of the heart which could be counted twenty-three times in a minute. It was in plain truth a painful duty to feel her pulse, and it was matter of wonder to me how life could be sustained with so broken a current of arterial blood pervading the system. The cause of the disorder was here manifest enough, and was clearly traceable to its

origin. The poor woman had lost, from epidemic disease, three of her children—all she had—at one stroke. In the midst of her grief she miscarried, and suffered from severe hæmorrhage. At the time she came to me she was still suffering from menorrhagia. Under tonic treatment and good food, coupled with soothing and encouraging words and hopes, this patient recovered beyond my first expectations. At the last visit she paid to me the intermittency was reduced to a single failure in one hundred and sixty pulsations.

(2) In another case, one I have now had under observation for five years, the patient, a gentleman about sixty years of age, told me that he became first conscious of intermittency in the action of his heart upon the anxiety he felt from the loss of one of his brothers, to whom he was deeply attached, and for whose superior talents he had, as indeed many others had, a profound admiration. The attacks at first were so severe that they created in his mind some alarm, but in the course of time he became accustomed to them, and the sense of fear passed away. The intermittency in this case alternates with periods in which there is very slight interruption of natural cardiac action. During these more natural periods there is, however, an occasional absence of systolic stroke once in two or three hundred beats, but the fact is not evident to the subject himself. When the extreme attacks are present the intermittency of pulse occurs six or even seven times in the minute, and the fact, which is subjectively felt, is very painful. The stomach at the same time is uneasy, there is flatulency, and a sensation of sinking and exhaustion in the region of the stomach. In the worst attacks there is also some difficulty in respiration, and a desire for more capacity for air, but unattended by spasms or acute pain. A severe attack is induced readily by any cause of disturbance, such as broken rest or any mental excitement; on the other hand, rest and freedom from care seem definitely curative for the time.

In this case another symptom was presented for one or two years, which is somewhat novel, and exceedingly striking in a pathological point of view. The symptom was this. When the intermittent action of the heart was at its worst there came on in the fingers of one or other hand a sensation of coldness and numbness, followed instantly by quick blanching of the skin, and precisely the same appearance as is produced when the surface of the body is frozen with ether spray. The numbness and temporary death of the parts would often remain even for an hour, during which time the superficial sensibility was altogether lost. When recovery recommenced in the fingers it was very rapid, and after recovery no secondary bad effects were ever noticeable.

Intermittent Pulse from Passion.

In some cases outbursts of passion are the prime source of intermittency of the pulse. One striking example of this nature was afforded me in the case of a member of my own profession. He admitted to me that original irritability of temper was permitted, by want of due control, to pass into a disposition of almost persistent or chronic anger, so that every trifle in his way was a cause of unwarrantable irritation. Sometimes his anger was so vehement that all about him were alarmed for him even more than for themselves, and when the attack was over there were hours of sorrow and regret, in private, which were as exhausting as the previous rage. In the midst of one of these outbreaks of short madness this gentleman suddenly felt as if—I use his own expression—as if his "heart were lost." He reeled under the impression, felt nauseated and faint; then recovering, put his hand to his wrist, and discovered the intermittent action of his heart as the cause of his faintness. He never recovered from that shock, and for ten years, to the day of his death, he was never free from intermittency. As a rule he was not conscious of the intermittency unless he took an observation on his own pulse as though he were apart from himself, but occasionally, after severe fatigue, he would be subjectively conscious of it, and was then much distressed and depressed. "I am broken-hearted," he would say, "physically broken hearted." And so he was; but the knowledge of his broken heart tempered marvellously his passion, and saved him many years of a really useful life. He died ultimately from an acute epidemic disorder.

Intermittent Pulse from Excessive combined Mental and Physical Fatigue.

After excessive mental and bodily fatigue, intermittency of the heart is a frequent symptom. Indeed, when such double fatigue is long continued, few persons escape. For this reason the symptom is exceedingly common in members of the medical profession who are exposed to night work, and who, in the presence of serious care, secure little rest. I have seen a large number of cases of this character.

A medical man in a large general practice, who was in the habit of attending from three to three hundred and fifty cases of midwifery in the year, and who rarely had two consecutive nights of unbroken rest, was suddenly exposed to mental depression, incident upon the death of his wife. His first acute symptom was a sharp pain running down the right side and right arm, and this was soon succeeded by a sense of internal feebleness. The sense of exhaustion was referred chiefly to the lower part of the chest anteriorly, and to the region of the heart, but the sufferer himself was not subjectively conscious of intermittent cardiac action. On examination I found that the cessation of the ventricular systole occurred from six to seven times in the minute, and extended not unfrequently over a full period of two seconds. I learned also, after a short time, that the sense of exhaustion was always co-incident with the periods of extreme intermittency. After a few nights of rest and some mental quietude, this patient made a fair recovery, and became able to carry out a considerable share of his professional work. But a little over-fatigue, a return of broken sleep, or even a slight over-taxation of the stomach, are sufficiently potent causes to reproduce the cardiac irregularity, with the sense of central exhaustion described above. Emotional excitement of any kind, if at all prolonged, is equally the exciting cause of a relapse.

This is a good typical case, selected from many of a similar class. In all I have observed the character of the work to be the same: it has been work not simply muscular, not simply mental in the purest sense of the term, but work in which great prostration from broken rest has been accompanied with equally great mental anxiety respecting results. From my observations I infer, on very safe grounds, that a man or woman may undergo any possible amount of pure muscular work without showing the least sign of intermittent action of the heart. The heart may wear out under muscular fatigue, and present various forms of organic changes, but it need not necessarily intermit with or from these changes. I infer again, also on very safe grounds, that actual hard work of brain, if the work be of a kind which does not excite the worker, or call into action the emotions, or lead from rest of sleep, may be carried on, even to apparent excess, without causing intermittent action of the heart. But whenever in conjunction with broken rest there is excess of labour, irregular mode of life, and, added to both, *anxiety*, then the conditions are present for the development of the phenomenon of intermittent action.

Intermittent Pulse following upon Adverse Fortune.

There is no more common cause of intermittent pulse than extreme reverse of fortune. A man poor at all times, having never felt the pride and power of wealth, may live to the fullest length of days free from any irregularity of circulation: but a rich man, and especially a rich man who has once been a poor man, brought suddenly low by adversity, rarely escapes that physical change, the outward manifestation of which is intermittent stroke of the heart. I could fill many pages in illustration of this fact, and could account, on physical principles, for some painful catastrophes which the world at large would probably trace to moral or rather immoral or immaterial agencies. Thus the physical basis of suicide lies in such close proximity with the basis of intermittent heart-stroke, that I doubt if any man or woman having a perfectly acting heart did ever commit self-destruction. Suicide is in fact a disease presenting certain well-defined physical symptoms, a disease admitting of diagnosis, a disease in which the *act* of suicide is but one part, a part holding the same relation to the disorder as the natural act of death holds to other disorders. Intermittent action of the heart as a sign of failure is therefore, when blended with other physical signs of the disease suicide,—on which I will one day try to speak at greater length,—an important sign, not of any value of itself absolutely, but of extreme value as part of a series of symptoms, which taken altogether are strictly diagnostic.

I could give the history of many cases in which reverse of fortune has led to intermittent action of the heart, but one illustration will serve.

A person, aged fifty, living in easy circumstances, and having little occasion to think of to-morrow, received news that a banking firm in which all belonging to him was embarked had suddenly collapsed. The shock at first produced faintness and coldness of the surface, followed by what was called "fever." In this stage of anxiety he was subjected also to some over-exertion, and to what seemed a chill from coldness of the air. He went to bed restless, and in sleep continued to dream of his losses. At one o'clock in the morning he awoke with a sensation of being engaged in a struggle, and soon became conscious of what is called "palpitation of the heart." It was not, however, a common palpitation, for it was attended with frequent cessation of action. In a few minutes the paroxysm subsided, but from thenceforward the pulse has continued to intermit, and vehement paroxysmal seizures of severe intermittent action, extending to embarrassment of the respiration, have many times been experienced. At the last visit paid me by this patient, the anxiety on which the symptoms depended having lessened, the acute-paroxysms had passed away, and the intermittent action, which the sufferer could always detect, had become "endurable."

Intermittent Pulse preceding Acute Mania.

Cases of acute mania not uncommonly, during their preliminary stages, afford typical illustration of intermittency of pulse.

(1) I was called once by a medical friend in the country to meet him in consultation in the case of a lady who was suffering from phthisis pulmonalis. When our consultation was over he asked me if I would see a working man, a mechanic, who was suffering from some peculiar condition of depression and occasional excitability, with a singular irregularity of the circulation. I found soon before me a fine, healthy-looking man, restless and miserable, and on listening to his heart I discovered an intermittency of action occurring after every ten or twelve strokes of the heart. At this time I knew nothing accurate as to the cause of intermittency, and therefore assumed that the heart itself was the seat of the malady. With this in my mind I suggested the administration of some tonic remedy, and expected to hear of a slow recovery, never dreaming of the advent of any acute disorder. But a few days later I was re-

qeusted to visit the same patient in a public metropolitan asylum. Then I learned that a day or so after my first visit to this man he had suddenly manifested acute mania, had attempted to injure some of his friends, and had made a serious and nearly successful attack on his own life. At my second visit on this patient the maniacal attack had passed away, and the pulse was now as regular and tranquil as could be. He made ultimately a good recovery.

(2) In a second case, which was long under my care, the case of a lady who had passed the middle period of her life, and who had been under restraint for temporary insanity early in her career, intermittency of the pulse was an invariable preceding symptom of attacks of semi-acute mania. In this case the maniacal symptoms were always emotional. However severe they were, however violent they were, there was some reasoning faculty intact, which as a rule, enabled her to control herself. So certainly premonitory of an attack was the intermittent pulse in this lady, that she herself was conscious of the premonition, and often sent for me simply because she had detected in it the first sign of an outbreak. She lived on in this way many years, and died at last from simple organic failure of the alimentary organs, her intellect remaining clear nearly to the last.

Intermittent Pulse from Hereditary Predisposition.

In two cases I have been consulted by patients suffering from intermittent pulse, who assigned hereditary predisposition as the cause of the irregularity. An analysis of the evidence presented in these cases seemed to me to establish the truth of the position assumed. Both patients were young, both had been free of any great and sufficient exciting mental cause, and both stated that their parents on the male side had suffered severely from the symptom, and that they in turn considered the symptom to have come, by descent, from their parents. It is fair, however, to notice that one of these two patients was subjected to considerable fatigue, involving disturbance of rest at the time he became aware of the intermittence, that the action of his heart was feeble, and that there was a constant sense of weariness, although his body was well formed and nourished, and his general appearance healthy. In this case the intermittent action was sharp and abrupt, and there was no double second sound, the interruption giving rise to a modification of heart sounds like this;—from the natural *Lūb dúp* 0, *to* 0 *dúp* 0, followed by the natural *Lūb dúp* 0. Under rest there was great improvement in both these cases, and I believe the patients are still living and pursuing their ordinary occupations, with little inconvenience; excess of exertion requires, however, to be strictly avoided by them.

Congenital Intermittent Pulse.

In one instance I noticed an intermittent pulse in an infant on the day of his birth, and it continued in him in the most marked degree for five years. It then gradually passed away. A medical friend once also brought me one of his children, a boy five years old, who had the symptom in an intense form, so that the parent was seriously alarmed; but the boy himself was quite unconscious of any suffering or ailment. In this case the symptom has disappeared, and the boy, now nearly fourteen years old, is in good health.

Intermittent Pulse from Old Age.

In old age intermittent action of the heart is exceedingly common. It is very rare indeed to find a person above seventy who does not present the symptom. At the same time it is not necessarily connected with length of days, for I once had the opportunity of examining the pulse and the heart of a woman, in the workhouse at Birmingham, who had attained the remarkable age of one hundred and three years, and in her case the sounds of the heart were as perfect as they could be in respect both to tune and time. The action of the heart was feeble, the strokes fifty-eight in the minute, but there was perfect natural action and natural accord between the respiratory sounds and those of the heart. This woman could always eat, drink, and sleep well, and it is singular that she was a devotee to tobacco. She smoked from the time she was a young woman, and no greater punishment could be inflicted on her than the depriving her of her pipe. In the old, when intermittent action of the heart comes on, it appears only to indicate a natural failure of power, and especially of power in the digestive apparatus and the other systems of simple organic or vegetative life. When aged people thus affected are dying from prolonged senile sleep, it is often to be observed that the intermission of the action of the heart extends over periods of several seconds, so that the observer wonders how life can be sustained with such loss of motion.

General Note on cases of Intermittent Pulse.

In the illustrative cases given above I have, I think, briefly but fairly indicated the great classes of cases in which the phenomenon is developed. From what I have learned it does not occur to me that intermittent pulse is peculiar to either sex, neither does it occur to me that any period of life is exempted from it; but it must be admitted, at the same time, that the symptom is most frequently seen in persons of advanced life, and that in very aged people the absence of it is the exception rather than the rule. It is by no means unfrequent in persons of middle age, and it is as common in those who are prematurely as in those who are veritably old. It is least frequent between the ages of ten and thirty years.

Intermittent Pulse in Inferior Animals.

I noticed in my original essay on intermittent pulse that the symptom was sometimes met with in dogs. A neighbour of mine had an old Italian greyhound that presented the phenomenon in the most singularly distinct form. I also had a dog that presented the symptom; this animal was not young, but hearty, and disposed to fat and somnolency. I have since met with several cases in dogs, but not in any other animal. It would be a very interesting and at the same time useful inquiry, in comparative pathology, to determine if the symptom be present in other animals, in horses specially, and I should be obliged if any medical man or veterinary surgeon who might observe the symptom in the lower animals would either favour me with the facts for publication or publish them independently.

CHAPTER IV.

ORGANIC CAUSE OF INTERMITTENT PULSE RESUMED.

The clinical history of intermittent pulse clearly in the mind, it will be advantagous to resume our study of the organic cause of the symptom. We have already seen that the heart itself is not the organ structurally diseased; we have excluded the blood; we have excluded the digestive system; and we have been driven to the nervous system as the seat of the organic mischief. The question remains—In which of the two great nervous systems is the change which leads to the failure seated? Is it in the cerebro-spinal system; or is it in the great system of organic life—the sympathetic system?

In my original lecture I took the view that the primary mischief was in the cerebro-spinal system, and was cerebral. In putting forward this view I was influenced by the idea that, because the disorder was excited by certain acts which we call mental, therefore the cause of the disorder was in the cerebrum. This hypothesis carried with it the commonly accepted notion that all mental impressions are received in, and that all mental acts proceed from, the cerebrum; a notion we cannot now hold with certainty. Our more modern observations lead us back to the view of the illustrious Bichat that the great ganglionic system is, possibly, the seat of all those mental acts which the metaphysician has designated as the emotions, passions, and pure instinctive expressions of man; the cerebro-spinal being the system of the pure intellectual life,—the life that learns and teaches, and in the highest natures controls even the emotions,—the life that supplies the evidence of the superior gift of conscience and consciousness, and which raises the human so far above the other animal existences.

With this change of theory respecting the functions of the great nervous systems, there must flow change of view in respect to the seat of disorder in cases of intermittent pulse. We have gathered the fact, from direct and unmistakeable evidence, that the primary cause of the phenomenon is shock or debility of those nervous centres which are instinctive or emotional; and if those centres be the ganglionic centres of the sympathetic system, it follows that they, and not the cerebral organs, are the original seats of the mischief. If they be not, then the prime mischief is situated either in the pneumogastric nerve or in the true nervous centres of the heart itself.

It will help us, in elucidating this part of our subject, to make reference to the most modern view respecting the nervous mechanism of the heart. This is that three sets of nerve structure concentrate on the heart, and are concerned in its action, (*a*) the cardiac ganglia, (*b*) the supply from the sympathetic derived from the cervical ganglia of the sympathetic system, (*c*) the cerebro-spinal nerve, the pneumogastric or vagus.

What is the object of this elaborate nervous mechanism?

The heart, a contracting and relaxing spiral muscle, is held by the nervous organization in the balance of two powers; or it may be more correct to say, the force liberated in the muscular structure of the heart is regulated by a balance of two nervous powers. The contractile act of the heart is *promoted* by the true cardiac nervous ganglia, and by the supply from the sympathetic centres; the contractile act is *controlled* by the inferior cardiac branches of the vagus. Hence when the vagi are divided, the action of the heart is for a time greatly accelerated: while, when the vagi are irritated, the action of the heart is rendered slower, and may be even temporarily arrested.*

When the sympathetic cardiac supply is irritated, the action of the heart is for a time accelerated, and when the same supply is enfeebled the action is rendered slower. Thus we can induce intermittent action of the heart in inferior animals, pigeons and rabbits, by the simple process of causing deep narcotism with chloroform or chloride of amyl. When either of these agents is carefully administered so that it may cause deep sleep, although there may be in the early stages of narcotism very marked irregularity of the heart, there will be no intermittency until the last degree or stage of sleep has been attained. The brain may be narcotised until all its functions cease, the spinal centres may in like manner be temporarily extinguished, the voluntary muscles may be utterly paralysed, and yet there may be regular though slow action of the heart. At last there is heard, as the prelude to death, if the narcotism be continued, the intermittent action, precisely as it is detected in the human subject in those who suffer from intermittent stroke.

Falling back on our knowledge of the nervous mechanism of the heart, we ask again, Where is the seat of the nervous lesion that causes intermittent action, and what is the nature of the lesion? It might be irritation of the pneumogastric in some part of its course, for irritation of the pneumogastric would cause slow action of the heart, and might momentarily stop action. It might be failure of power of the sympathetic cardiac supply, or of the true cardiac centres, for exhaustion of supply from the sympathetic and cardiac ganglia would create failure and cripple action. From all the evidence I have before me, I am led now to the view that the cause is failure of the sympathetic supply to the heart. As this view is corrective of the view I first advanced, in which the cerebral origin of the disorder was indicated, it is right I should briefly explain the reasons for such modification of opinion. The reasons are as follow :—

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* In the volume of the "Journal of Anatomy and Physiology" for May, 1869, the reader will find an admirable paper on the Function of the Pneumogastric Nerves, and the Motion of the Heart, by Professor Rutherford, of King's College. The paper defines, more clearly and perfectly than any I have read, the nervous supply and nervous mechanism of the heart.

(1) A larger experience of the disorder has failed altogether to lead me to connect the phenomenon of intermittent action with any other symptom of cerebral lesion : such as paralysis of motion or sensation, convulsion, chorea, cranial pain, or any special symptom pointing to cerebral complication. I look over the records of the last fifty cases I have seen, and I find not a symptom of certain cerebral or spinal lesion. It seems to me almost impossible to assume that if the cause of the interruption of the heart were cerebral or spinal—if for instance there were disease implicating the pneumogastric at its origin—there could be persistency of the one symptom, and no sign of any other symptom of a cerebral nature.

(2) If the symptom were due to irritation of the pneumogastric in some part of its wandering course away from its origin, there would be afforded some very distinct evidence of the fact. There would be symptoms of pain or of nausea, or of disturbance of the stomach, whenever there was disturbance of the heart. But on referring to actual facts, I find no indication whatever of any such necessary connection of symptoms. I infer, therefore, that in cases of intermittent pulse the pneumogastric is, as a rule, quiescent.

(3) The symptom of intermittent pulse does not appear to me to be dependent upon irritation and exaltation of function of nerve. In all I have seen of it it has been connected with failure of nervous power, and with failure of the heart, not because the heart is arrested by any overruling force, but because it is not supported by a proper and efficient force.

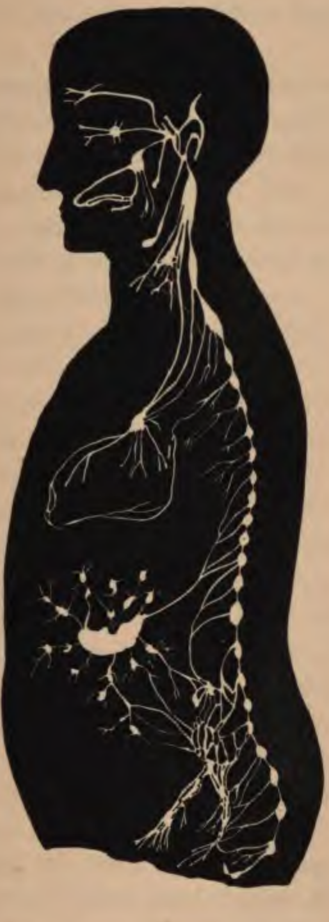
(4) The evidence derivable from experiment with narcotics

seems to me conclusive against the cerebral origin of the symptom, for it is not in the stage of general muscular excitement, when the pneumogastric clearly is under excitation, that the symptom is demonstrated, but at the stage when the cerebrum is practically dead, when the muscles which are under cerebral and spinal influence are dead, and when nothing lives except the cardiac ganglia, and their reserve, the sympathetic cardiac ganglia.

(5) Further, the same experiment differentiates between the action of the sympathetic cardiac ganglia, and the true cardiac ganglia; for when the sympathetic fails in function, and intermittent action is developed, the cardiac centres still sustain a feeble action, even when all other nervous communication is cut off. Hence the failure does not lie in the true cardiac centres.

(6) The last reason for a modification of view respecting the seat of nervous lesion in cases of intermittency of the pulse, is the strength of the proposition that the centres of the great ganglionic system are either the distinct centres of the emotional faculties, or that there is a direct connection between the sensorial organs and the sympathetic, so that emotions received through the senses are at once transmitted to the organic centres. It was demonstrated many years ago by the distinguished physiologist, Dr. Wilson Philip, that the ganglionic system can be excited to action through the sensorial organs without exciting the muscles called voluntary; and that when an impression which excites us involuntarily is received by the senses, it must pass through the involuntary nervous system to the involuntary muscles. Thus, change in the centres of the involuntary nervous chain may be excited by what is called mental impression, and central function may be destroyed as easily by such an impression as by a physical injury.

I look at the diagram of the organic nervous system, and see there depicted the emotional brain. If we could put the organic



OUTLINE OF ORGANIC NERVOUS SYSTEM.

ganglia and their nervous filaments, as a distinct system, side by side with the cerebro-spinal system, we should probably discern a system as extensive as the cerebro-spinal itself, the centres of which, subject to certain voluntary control, condense and regulate the force which is expended on instinctive and involuntary action.

In simple truth, every human possesses two nervous natures. The one primitive, impulsive, instinctive, propelling, sustaining, and probably capable of no immediate or direct education; a nature seated in the ganglionic centres. The other secondary, receptive, directing, controlling, and susceptible of direct education; a nature seated in the cerebro-spinal centres.

We are all conscious of these two natures. We laugh, or cry, or move, instinctively, at something that affects or influences our organic system, and we control ourselves by an act of reason, or in other words an act of brain, and we say the thing was worth laughing at, or crying at, or moving for, or it was not worth it, as we say of a commodity we have bought, it was, or it was not worth what we gave for it. Thus, like the centrifugal and centripetal forces, the two forces in our body act, the one in subjection to the other; and if in any given case the emotional centres were to be excited to such degree that the controlling or cerebro-spinal organs lost their power, I see no reason why a person should not laugh, or cry, or move, under emotional impulse, until he died. In hysteria we see the effect of emotional impulse carried a long way towards death; in the dancing mania of the middle ages it was carried, in hundreds of cases, to the actual catastrophe of death.

And what is more, we are not only conscious of the two natures, but we refer the emotional nature to its true seat. We say of sorrow, "it sits heavy on the heart," and the glow of pleasure, or the gust of fear, are each immediately conveyed to us by sensations distinctly referable to the organic nervous centres, not to the reasoning brain, which at once endeavours to exert its controlling, its balancing power. And so intermittent action of the heart, as it is due to what may be considered accidental failure contracted during an intense emotional effort, or to senile failure of organic function, is traceable, I think, fairly and logically to failure of those centres of the sympathetic system which supplement the true cardiac centres in supplying contractile power.

Of the nature of the failure of the nervous centres we know as yet so little, that the best pathologist can scarcely speak with authority. Indeed, the whole subject of the morbid changes belonging to the ganglia of the sympathetic system is still imperfectly known. But from a physiological point of view, we may safely infer that each centre of the nervous system is a reservoir or receptacle of force derived, not merely from the blood with which it is fed, but also from the parts which the nerves are said, incorrectly, to supply. In these centres, molecular changes, as yet, to us, imperceptible, may be understood as inducing deficiency of retaining power, and what is commonly called nervous debility and exhaustion, so that the centres cannot persistently carry on their allotted natural function.

It will add to the truth of the theory I have put forward respecting the seat of disease in cases of intermittent pulse, to refer to an experimental truth adduced in my original paper. At the time when that paper was written and my mind was charged with the idea of the cerebral origin of intermittent action, I conceived it would be possible to induce intermittency by temporarily destroying cerebral function. I therefore entirely destroyed brain function by freezing the hemispheres in an inferior animal, but, although by this method the most complete insensibility was induced, there was no satisfactory indication, as I then reported, of intermittent motion of the heart. I thought this result was due to the circumstance that the parts at the base of the brain had not been affected. But

I have since found that if an animal be rendered insensible by exposure of the whole cerebrum to extreme cold, there is no intermittent action: if, however in this state the animal be allowed to inhale vapour of chloroform, the intermittent action is at once set up, the ganglionic organic centres being now involved. At the same time, the ganglionic system may be influenced by some physical injuries of the cerebral surface, without implication of the voluntary nervous system : this is occasionally seen in cases of concussion.

The recent researches of Waller, Rutherford, Wood of Philadelphia, and others, on the functions of the pneumogastric, deserve, finally, a word. It has been so clearly demonstrated that irritation of the pneumogastric produces what is called "slowing" of the action of the heart, the inference seems to come naturally that intermittent action is or may be a result of such irritation. But direct observation does not support this view. When the pneumogastric in the neck is subjected to irritation, the action of the heart is lowered, and there are induced signs of faintness, and what Waller calls asthenia. Waller has in fact induced temporary faintness in the human subject by mechanical irritation of the pneumogastric, for the purpose of aiding in the reduction of dislocation.* But from what I learn from observation on the inferior animals, the same irritation, while it produces symptoms of faintness and asthenia, does not produce the intermittent cardiac action which is now under our consideration; and, what is equally to the point, patients suffering from intermittent pulse are not necessarily subject to symptoms directly indicating irritation of the pneumogastric.

I repeat, therefore, my present conviction, as I close this section of the subject, that the seat of the nervous lesion is in the nervous centres which supply the reserve contractile power of the heart, I mean the sympathetic nervous centres that go to

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* Proceedings of the Royal Society, May, 1870.

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feed the heart, and that the change in those centres, whatever it may be physically, leads to their failure as reservoirs or condensors of force.*

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* I must not allow this paper to leave my hand without acknowledging a work indifferently known, and yet full of the most suggestive and original thought. I refer to the work of Dr. Davey, of Northwoods, Bristol, on "The Ganglionic Nervous System." Dr. Davey has most clearly appreciated the functions of the organic nervous centres, and has described his views in a volume which, when the jealousies, prejudices, and ignorances, that always beset the present, concerning the present, have passed away will be discovered by some future and unbiassed scholar as a neglected classical work of the physic of the nineteenth century.

CHAPTER V.

ON THE SIGNIFICANCY AND PERSISTENCY OF INTERMITTENT PULSE.

The Significancy of Intermittent Pulse.

In itself, when it is not present in an exaggerated degree, intermittency of the pulse is less dangerous than it seems. It does not, as might be feared, carry with it the necessary idea of sudden dissolution from heart disease, for, as I have elsewhere shown, the heart is the regulator, not the prime mover, of the circulation. The harmlessness of the symptom in its moderate development is best shown by the facts of its common occurrence after middle age, and the long duration of life in many of those who present it.

At the same time the symptom has its significance. Occurring in infancy, it is an important indication of the existence of serious nervous derangement. Occurring in adults it has the same meaning, and tells the story of commencing failure of power. Occurring suddenly after any great event, which has told upon the mind, it may be a sign of serious import. My own experience connects it as the first physical indication of derangement in three cases of disorder of mind in which suicide was attempted, in two of the cases successfully. Further, it becomes an embarrassing sign in all conditions where there is diminished condensation of force in the nervous centres, where force is either not laid up or is given out too freely.

In persons advanced in life, and in persons prematurely old, intermittency is often the herald of symptoms of nervous failure. In these examples the patient has sometimes a singular preconception of impending danger; he is seized without reason with what I once heard a patient call "panic." These also are cases of very serious import. The symptom may again be increased until it lapses into veritable and fatal disorder, from continuance of morbid change in nervous matter.

In the large majority of patients there is an unconsciousness of the intermittency. We listen to the heart, we hear the phenomenon distinctly, and we ask the patient, at the moment, whether he is conscious of anything peculiar, and he tells you he is not. In such instances, the intermittent phenomenon does not cover more than what would be one or at most two normal periods of cardiac contraction, and there is a long interval before the return of it. But when the intermittency covers a period equal to five normal strokes, or when it is repeated in shorter periods, several times in the minute, then the patient is painfully, often fearfully, conscious of the fact. Then breathing becomes irregular, then there is difficulty in keeping the recumbent posture, then there is sleepless agitation, terrible mental depression, a constant dread of death, sometimes with a singular longing for that event, and finally death itself, not suddenly, but by a lingering and sinking asthenia. These are true cases of what has been poetically called "broken heart."

I have seen one well-marked case, already referred to, in which it was impossible to attribute death to any other cause than intermittent cardiac action, and I do not remember any case where the symptoms, which long preceded death, were so acutely painful. The heart intermitted in this patient, ten, and even twenty times in the minute, and some intervals of hesitation were so prolonged, that sense of faintness and impending death tormented the sufferer. He feared to lie down, since that increased the evil; he feared to sleep for the same reason; and as he got weaker from pain and broken rest, the intermittency itself became intensified, despite all our efforts, until death came to bring the only possible relief.

A case such as is here related is, truly, extreme and rare, and I do not adduce it as suggesting undue alarm respecting intermittent action. I would give to the symptom its just value, and no more. Whenever it is persistently present in any person, the actual value of life as compared, *cæterus paribus*, with the life of another person who has no such symptom is reduced; the power for work is less, the power to meet extremes of heat and cold is less, and the power to meet the anxieties and calamities of life is unquestionably much less. The man or woman with a hesitating heart is thereby unfitted for sudden tasks, demands, resolves, which, when the heart is firm, are considered as of comparatively little moment; for when the heart hesitates, the brain, which reposes for its power on the blood the heart supplies to it, falters with the heart, just as the gas flickers when the steady pressure is taken off the main. From these circumstances some persons who once were known as resolute and determined, lose those qualities when they are subjected to intermittent action of the heart, becoming, as their friends say, uncertain and doubtful in character, becoming, as they themselves feel and know, less the masters of themselves, and less secure in their own work, and skill, and power.

Another point is worthy of note. Persons in whom there is permanent intermittent action of the heart pass through all acute diseases with less chance of recovery than others of similar age and like constitution who have no cardiac failure. They sink more readily from surgical operations, from falls and injuries, from influenza, from acute congestion of the lungs, from inflammatory attacks, and peculiarly from typhus and typhoid fever. I would look upon a man's chance of recovery from typhoid if he were fifty years of age, and had a steady heart, as preferable to that of another man at forty, in whom intermittent action of the heart was developed before the occurrence of the disease, or in whom the symptom came on, as it sometimes does come on, in the course of the disease.

Such are the principal facts conveyed to the mind when the phenomenon of intermittency of the pulse is before the practitioner. The phenomenon is truly to be reckoned only as one symptom, and I would in no sense exaggerate its importance. At the same time, in severe justice, it is correct to say of it that the person who presents it, though he may live long, is of infirm body, that his cardiac mechanism is out of tune, that if ever his heart should be called upon for a great effort, it will not be prepared for the effort; and that if ever, from mental strain or pressure, his heart is weakened, it will succumb more easily than it ought naturally to succumb to the resistance put upon it.

Thus the phenomenon, symptom though it be, is of moment; it is of such moment that if two men, of equal age, build, education, and power, were put into any contest, mental or physical, and the one had, and the other had not, intermittent pulse, the chance of success would be altogether in favour of the man whose heart was not intermittent. In like manner, if two men of equal apparent build had to contend with a surgical operation, a disease, or a given equal amount of anxiety, the values of resistance are beyond measure in favour of the man whose heart was not intermittent.

The phenomenon has therefore its general meaning, both for the physician and the surgeon. It has also its particular meaning, since it may be raised into fatal consequence by disorders which need not, in its absence, prove fatal.

The Persistency of the Symptom.

In children the symptom of intermittency of the pulse may pass away with growth and increase of strength: in adults, when the symptom is once established, it never, I believe, goes away entirely. It may be absent for long periods when the general health is good, but it returns on every occasion of depression of power, and is very easily induced by agencies which act deleteriously on the nervous system. Excessive venereal gratification, excessive smoking, deficiency of sleep, and dissipation, act powerfully in increasing the evil. In persons at or past middle age, the symptom, if it once be fully developed, continues persistently, and often to extreme old age. One of my patients, who died at eighty-six years of age, told me he had been discovered to have an intermittent pulse when he was forty-two, and that he had never failed to exhibit the phenomenon since that time.

CHAPTER VI.

TREATMENT—POINTS OF PRACTICE.

There is no known specific treatment for intermittent heart, but, whenever the symptom of intermittency is present, there are certain general lines of treatment which should always be enforced by the physician.

(1) In the case of young children, when the intermittency is clear, however infrequent it may be, the utmost care should be taken to avoid every source of mental emotional excitement. A child having intermittent pulse should not, under any pretence, be oppressed with study. He should not be subjected to any amusements which powerfully excite the mind; he should not at any time be exhausted by physical fatigue; he should be well fed, warmly clothed from head to foot, and, above all things, should be allowed to have abundant sleep. Ten to twelve hours' sleep is not a moment too much. Moreover, such a child should never be put to sleep with stories which excite dreams or cause alarm.

(2) In adults equal care should be taken, and, above all things, attempts should be made to remove impressions derived from any untoward event. Change of scene should be recommended, while a carefully regulated diet, abstinence from exhausting pleasures and abstinence from exhausting labour, especially mental labour of any one particular kind, should be encouraged. Good sleep is here again the most valuable of remedies. Eight hours of sleep out of the twenty-four are essential, nine hours are still better. Two other special points

of advice are of moment. It not unfrequently happens that, by accident or by direct information, patients learn the fact that their pulse intermits. Then they begin to feel their own pulse, and become charged with dread of sudden death. As the disorder is of itself mental, this watchfulness and fear will increase the frequency of the intermittency. With these patients, a word from the physician timely and firmly spoken is often the best prescription. He assures them on the results of experience that their malady is not of necessity fatal; he commends them not to enquire after the symptom, and if he can succeed in persuading them to his views, which he may honestly try to do with all his influence, he will effect the most marked improvement in their condition. Again, it sometimes happens that patients conscious of the failure of the heart resort to alcoholic stimulants as a means of relief. For a moment, by its exalting the activity of the heart, alcohol affords relief, but the depression that follows calls the more rapidly for a return to the supposed remedy, and a fictitious benefit leads to a habit which excites structural changes and hastens death.

(3) In cases of sudden intermittency, with symptoms of cerebral congestion, depletive measures are sound. A purgative is essential, and blistering at the back of the neck is always useful. I have seen also great advantage in these cases from abstraction of a moderate quantity of blood by the cupping glasses.

(4) In chronic extreme forms of cardiac intermittency, while all the general rules laid down in Nos. 1 and 2 hold good, it becomes often imperatively necessary to subdue nervous excitement, and to induce rest. For this latter purpose, opium is the sheet anchor. It must be given freely when it is given, and not too frequently. Small and repeated doses of opium excite, depress, and give no rest. A full dose, equivalent to a grain or even two grains, produces, on the contrary, no excitement, but gives sound sleep and that quietude of circulation

which is essential to secure a satisfactory relief. I have sometimes, where there was much depression, combined opium with full doses of quinine with marked benefit.

(5) Concerning old people who suffer from what may be called chronic intermittency without oppressing symptoms, no special rule requires to be laid down. They are themselves usually too tired of the excitements of life to care for them, and if they are not, then the observance of the general principles applicable to children and adults extends equally to them.

The above general rules of practice, written in 1868, hold good, and require no modification; but I have since learned a few details of practice which are useful, and which deserve to be added in this chapter. In the first place, whenever with intermittency of the pulse there is anæmia with atonic condition of the bowels, and distention of the stomach and intestines with gas, it is very good practice to add, to the general rules of treatment, a tonic so called, and of all tonics Easton's Syrup of the Superphosphate of Quinine, Iron, and Strychnine, is the best. This syrup, which contains the thirty-second part of a grain of strychnine in a fluid drachm, should be administered in doses of a drachm three times daily, a little time after food, and the patient should be induced to look upon the remedy in the light of a food rather than a medicine. The syrup may be continued for two and three months at a time without danger, under the careful observation of the practitioner.

In some cases of intermittent pulse I find a tendency to periodical neuralgia. Sometimes the neuralgia attacks the nerves of the face, sometimes the sciatics, sometimes the pneumogastrics. When this symptom is present the intermittent action is intensified; not, I believe, from any direct connection between the neuralgic pathological state and the irregular action of the heart, but from the broken rest and anxiety which the neuralgic pain induces. In these cases, in addition to Easton's syrup, which still maintains its position, quinine in free doses—two to five grains—is required, together with morphia when it is necessary to procure sleep by artificial means. Hydrate of chloral is also useful in this class of cases, but I do not find it is better than morphia. I have, lately, sometimes combined the hydrate with morphia with advantage.

There are classes of cases in which intermittent pulse is connected with great general prostration and premature breaking up of the body; cases in which there is some organic disease, such as chronic bronchitis, emphysema, senile phthisis, cirrhosis, disorganization of the kidney, or other organic change; or some general systemic disorder, such as diabetes or cancer. In any of these cases the intermittent action is a terrible addition to the distress of the sufferer, and it may require to be treated itself as the worst present evil. Under these circumstances, with an occasional alternative, I find the following compound of most service for the intermittency:—

Mixture of Iron, Morphia, and Ammonia.

Sulphate of iron, grs. xxx.
Carbonate of potash, grs. xxv.

Rub together dry into a fine powder; pour on distilled water in small quantity so as to make a thin paste, and when the green carbonate of iron is formed, add—

Bicarbonate of ammonia, grs. xxiv.
Solution of hydrochlorate of morphia, ʒ ss.

Finally add—

Proof alcohol, ℥j.
Pure glycerine to ℥iij. Mix.

Of this mixture the dose is from two to three fluid drachms, which dose may be taken three or four times in the twenty-four hours. I know of nothing that gives such speedy relief to the intermittent action, or that more strictly acts in the sense of a "tonic," than this mixture, in the cases named.

I have made many enquiries in order to ascertain if there be any one particular remedy which so influences the nervous mechanism of the heart as to exert an immediate controlling effect over intermittent action; and the result of my research is that there is only one agent which can be said positively to influence it; I mean to influence it at once in such determinate manner that an effect is seen to follow upon a cause. The agent to which I refer is alcohol, and the mention of alcohol brings up the whole question of its use in cases of intermittent action.

It has been long known that the direct physiological action of alcohol is to quicken the motion of the heart, and Dr. Parkes and Count Wollowicz, in an admirable paper published in the Proceedings of the Royal Society for May 1870, have demonstrated that in a healthy man the daily increase of the beats of the heart under alcohol, as compared with the number of beats when water is the only beverage, is rather more than thirteen per cent. The results obtained by these authors are so curious and important that I subjoin them, verbatim, in a foot note.[*]

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[*] "The average number of beats of the heart in 24 hours (as calculated from 8 observations made in 14 hours), during the first or water period, was 106,000; in the alcoholic period it was 127,000, or about 21,000 more; and in the brandy period it was 131,000, or 25,000 more.

"The highest of the daily means of the pulse observed during the first or water period was 77·5; but on this day two observations are deficient. The next highest daily mean was 77 beats.

"If instead of the mean of the 8 days or 73·57 we compare the mean of this one day, viz., 77 beats per minute, with the alcoholic days, so as to be sure not to over-estimate the action of the alcohol, we find:—

On the 9th day, with 1 fluid ounce of alcohol, the heart beat 4,30 times more.
On the 10th day, with 2 fluid ounces, 1,872 times more.
On the 11th day, with 4 fluid ounces, 12,960 times more.
On the 12th day, with 6 fluid ounces, 30,672 times more.
On the 13th day, with 8 fluid ounces, 23,904 times more.
On the 14th day. with 8 fluid ounces, 25,488 times more.

"But as there was ephemeral fever on the 12th day, it is right to make a deduction, and to estimate the number of beats in that day as midway between the

In intermittent pulse this direct action of alcohol on the heart is shown with singular effect. I have seen in an extreme case, where the fact of intermittency was recorded ten times in the minute at least, a total cessation of the phenomenon within five minutes after the administration of an ounce and a half of sound brandy, the circulation at the same time being rendered more rapid. This action of alcohol is so decisive that the patient himself soon becomes conscious of it, and perchance resorts sometimes to the remedy, as if by instinct, to his ultimate disadvantage. Here then we have an agent which for the moment gives relief to the symptom. It does not cure, but it relieves: it does not now act as a narcotic, for intermittent action of the heart, a symptom not of excitement, nor of irritation, nor of over-action, but of failure of nervous power, is not directly relieved by a narcotic; but it stimulates the flag-

11th and 13th days, or 18,432. Adopting this, the mean daily excess of beats during the alcoholic days was 14,492, or an increase of rather more than 13 per cent.

"The first day of alcohol gave an excess of 4 per cent., and the last of 23 per cent.; and the mean of these two gives almost the same percentage of excess as the mean of the 6 days.

"Admitting that each beat of the heart was as strong during the alcoholic period as in the water period (and it was really more powerful), the heart on the last two days of alcohol was doing one-fifth more work.

"Adopting the lowest estimate which has been given of the daily work done by the heart, viz., as equal to 122 tons lifted one foot, the heart during the alcoholic period did daily work in excess equal to lifting 15 8 tons one foot, and in the last two days did extra work to the amount of 24 tons lifted as far.

"The period of rest for the heart was shortened, though perhaps not to such an extent as would be inferred from the number of beats; for each contraction was sooner over.

"The heart on the fifth and sixth days after alcohol was left off, and apparently at the time when the last traces of alcohol were eliminated, showed in the sphygmographic tracings signs of unusual feebleness; and perhaps in consequence of this, when the brandy quickened the heart again, the tracings showed a more rapid contraction of the ventricles, but less power, than in the alcoholic period. The brandy acted, in fact, on a heart whose nutrition had not been perfectly restored.

"The peripheral circulation was accelerated and the vessels were enlarged; and the effect was so marked as to show that this is an important influence for good or for evil when alcohol is used.

"Referring only to this healthy man, it is clear that the amount of alcohol the heart will bear without losing its healthy sphygmographic tracing is small, and it must be supposed that some disease of heart or vessels would eventually follow the over-action produced by large doses of alcohol."

ging power. The question therefore arises—To what extent is alcohol useful as a remedy for intermittent heart? This is a very delicate and difficult question to answer; for unfortunately the remedy itself, if carried too far, increases, after a time, the primitive evil, and as it is a remedy always at hand and viciously pleasant, its bad rather than its good influence is the most probable event. The advice I have to offer on the matter is nevertheless simple, simple because it has been learned by repeated experiences in many cases, and because the results from it are very uniform. I recommend all who suffer from intermittent pulse to abstain from alcohol in every shape as far as is possible, and resolutely to abstain from every alcoholic fluid respecting the character of which there is the merest doubt. There are some fluids, such as champagnes, sweet ports, and even light acid wines,—clarets, burgundies, hocks,—which, so soon as the short stimulating action they produce has passed away, induce great prostration, with marked increase of intermittent action, if they have been taken in any free quantity. All these must be avoided. Objections may also be taken to rum and gin. A person with intermittent pulse is in short brought to the use of three ordinary alcoholic drinks—sound light ale, sound light sherry, and sound brandy the strength of which is known. As a rule, I do not find that any harm follows a moderate use of sound light ale, provided the quantity taken do not exceed three half-pint glasses a day; or, if sherry be preferred to ale, I do not, as a rule, find harm resulting from three wine-glasses of it in the day: but beyond these measures all is hurtful. As to brandy, although I have mentioned it as allowable, it must be considered only as a reserve force, to be called in when there is real and urgent necessity for it, and then in a moderate degree. If after great fatigue or excitement or anxiety, there is sleeplessness, restlessness, and painful knowledge, on the part of the patient, of the hesitation of the circulation, half an ounce or an ounce of brandy will act, generally, in the most effective manner. It will bring rest at once, and, often when a narcotic fails, sleep: but it must be repeated only after an interval of seven or eight hours; if it be carried to the extent of producing the third, paralysing or narcotic, degree of alcoholic stimulation it will have conferred evil instead of good.

I have suggested the above method of administering alcohol, because it is practical and is most likely to fall in with the ordinary mode of life of the majority of patients. But persons who object to alcohol, and these are daily increasing, need not have the agent pressed on them, except in extreme circumstances where the dose is needed in the true medicinal sense. In the medicinal sense it is best to prescribe absolute alcohol, ordering it in half the proportion of the best brandy. Half a fluid ounce to six fluid drachms will be sufficient in four ounces of water, to which may be added ten grains of bicarbonate of potash or twenty minims of sal volatile if there be acidity of stomach or eructation.

In some instances, instead of prescribing common or ethylic alcohol, I substitute pure methylic alcohol. This is a much lighter spirit, and is eliminated more quickly from the body. The dose is the same as for common alcohol, and may be prescribed in precisely the same way, with the advantage that it may be more frequently repeated than the same dose of ethylic alcohol.

I think I have now said all that needs be said respecting the use of alcohol in intermittent heart. I have expressed a fact, a practice, and a caution. The fact, that alcohol by its stimulant action on the nervous mechanism of the heart will temporarily remove intermittent action. The practice, that in extreme cases and at extreme crises, alcohol may be advantageously prescribed to relieve the symptom. The caution, that in prescribing alcohol it is never necessary to let the occasional glide into the habitual practice of taking it, the tendency of the remedy being, when it is often and systematically repeated, to increase the primitive disorder.

It is better that a patient who suffers from intermittent pulse should not smoke tobacco. It has been assumed by some that tobacco may even induce intermittent action, and I have seen one or two cases which would engender a suspicion that both smoking and snuff-taking might be set down as causes. But longer observation tells me the suspicion is not correct. If the practices named were true and independent causes of the phenomenon, we should find, frequently, cases in the male sex where the cause stood alone, and we should also find the phenomenon much more common in men than in women. In truth, however, I have never seen a *pure* case of intermittency from tobacco; neither have I been able to discover that the male sex is specially liable to the affection. At the same time, it is unquestionably true, that when the symptom is developed smoking and snuffing intensify it, not, I think, from any special influence, but from the general debility induced, the steady indigestion which the narcotic sustains, and the restless muscular action—tremor—which it favours and supports. Tobacco, in a word, acts like other depressing agencies, such as loss of blood, or want of sleep, or deficient food, or bad assimilation of food; it injures as a secondary cause; it does not produce from the first.

In men who chew tobacco, and in men and animals under the direct poisonous influence of nicotine, I have watched for the symptom of intermittency of the cardiac motion without result. The action of the heart may be feeble and irregular, the muscles in a state of restless tremor, and the body cold. But there is no pure intermittent action. The symptoms from nicotine are those of cardiac apnœa, of failure of the right rather than of the left side of the heart, with difficult respiration; and, in man, spasmodic pain passing through the thorax, from the sternum to the crura of the diaphragm. A marked case of this kind is recorded in the essay on cardiac apnœa in my "Asclepiad."

The remarks made in reference to tobacco apply equally to tea. Tea does not produce intermittent heart, but when the symptom is present it very seriously increases it; tea, in short, is an article of diet, which in all cases of irregular action of the heart should be scrupulously avoided. Coffee is less objectionable.

In respect to the diet of persons suffering from intermittent pulse, little in the way of special rule can be said, because in each case there is commonly some other functional organic disorder which calls for special attention, the intermittency remaining as a systemic failure rather than as a distinct malady. But one general remark applies to the general condition—viz., that food should be taken by sufferers from intermittent action in moderate quantities and *frequently*. Long fasting is unspeakably prejudicial, and makes itself speedily felt by the patient, who writhes, while fasting too long, under an indescribable exhaustion, which is not hunger, and not faintness in the natural sense of those terms, but a strange mixture of both sensations with a frequently recurring impression that if food do not immediately come death must. The nervous supply of the heart in these cases is sensitive of the least failure of power, and requires renewal every three or four hours during the working day. At the same time, the system rebels against a large, hardly digested, and oppressive meal.

One note more occurs to me respecting meals. There is a common feeling against *late* meals, late dinners or suppers, and I have no intention of opposing that which is not only a common, but as a rule, a natural and correct objection. Experience, however, tells me that to retire to rest with the body fasting is as bad a practice as to retire to rest with the stomach busily digesting. A light meal taken an hour or two before sleep is, I think, good for everyone, and it is essential for those who suffer from intermittent action of the heart. The last meal should certainly not be large, and should consist of some very simple easily digested food, such as milk, or cocoa, with bread and butter, or some similar food, tea being specially excluded. In extreme cases of intermittent action it is also good practice to let the patient have a glass of milk, or of milk diluted with water, at the bedside during the night. The period of the approach of the early morning, the hours between two o'clock and the dawn of day, is a period when the strongest are at their weakest, and the weakest at their worst; and so it commonly happens that the very weak die in the hours named. In the same hours persons who suffer from feeble and intermittent cardiac action commonly become restless, wake with sensation of exhaustion, and, if they are not sustained, sleep afterwards indifferently. At this period the reserve of food I have suggested is the best remedy; it relieves the exhaustion and restlessness, and ensures return to a sleep undisturbed by dreaming melancholy, and from which waking is the taste of the refreshment of sleep that has been bestowed.

A word as to warmth and clothing, and I have finished what I have to say on points of practice. Persons who suffer from intermittent action of the heart, whether they be young or old, should at no time expose themselves to loss of bodily heat. They should not, for example, take cold baths nor shower baths, but should in every habit study to follow a medium course. In every season the body should be so clothed that sensation of coldness shall not be felt. Flannel should be worn next the skin at all times; thin flannel in hot, thick in cold weather. Care should be taken, also, to protect the body from damp and wet. In a word, every such provision should be made as will sustain equality of vital process, so that the nervously disabled heart may neither wait long for new support nor be taxed with labours it cannot, at its best, fulfil.

CHAPTER VII.

ON PALPITATION OF THE HEART.

Connected with the subject of intermittent action is that of palpitation of the heart. I believe that all persons who suffer from intermittent pulse have attacks of palpitation, but some persons have palpitation who are not liable to intermittent motion. The symptom of palpitation is not always well defined, nor is it at all times defined in the same terms. One calls it a fluttering of the heart; another, a fluttering within the chest; a third, palpitation or throbbing. The symptom, moreover, is not uniform in character. At first it is noticed as if proceeding from the stomach and ascending to the throat, giving a singularly unpleasant tickling sensation in the back of the throat, with fulness. Exertion after meals is a common apparent cause of this palpitation, which, though comparatively devoid of danger, is still often a disagreeable and even alarming condition to those who have to endure it. After a time other symptoms occur, and are embarrassing. On lying down to sleep there is disturbed action or movement in the chest, with over-action of the heart, so that the action can be heard loudly through the pillow; and this is followed by frequent twitching of the muscles of the limbs, of the lower limbs especially. In most instances of this character the limbs actually move as if under the influence of a galvanic shock, and with the movement, or immediately preceding it, is a painless movement in the chest, as if from a jerking act of the heart itself. During this condition the motion of the heart may be actually intermittent, but the jerk I speak of is distinct from intermittent action. All the time through there is no pain, and I may add that all the time through there is no spasm. In this point of view the paroxysm of palpitation differs from a paroxysm of cardiac apnœa. Physiologically, the motor tracts only of the nervous organism are deranged. After a longer or shorter period sleep comes on, at first perhaps starting and disturbed sleep, but anon quiet; with the quiet, and with placid sleep, all the signs of irregular muscular motion disappear.

In persons strongly disposed to the form of palpitation now described, it is remarkable how small a matter will excite a paroxysm in the latter part of the day; late hours, indulgence in strong tea, indulgence in tobacco, too hearty a supper, these all tend to bring on the irregular action and the sleepless disquiet. But that which induces the nervous symptoms most readily is emotion or continued mental exertion; either of these, especially at the hour of rest, are peculiarly provocative of the mischief of which I now speak. Some *amusements* of the evening, even, lead to this disturbance. Chess is a game very bad for a late hour; played earnestly and intelligently, it calls special faculties into undue action at the expense of other faculties; it leaves active faculties at work; it leaves, that is to say, some of the cerebral centres still thinking, and these, like troublesome, noisy companions, are fatal to repose. In a lesser degree, and with irritable persons in as great a degree, late whist is bad. Nay, I know of nothing worse than quarrelsome whist with the stake high. A game of this kind may be ended, but hours will pass before the dissatisfied and quarrelling mental organs within the player will arrange terms and settle down. Reading late in the night and reading aloud are especially mischievous.

The worst mischief of all is the practice of carrying to bed the anxieties and annoyances of the labours of the day. I believe that more than half the cases of palpitation of the heart occur from this one mistaken and foolish practice. It is a practice from which success can never follow, for the organ wanted, or is not readily tolerated, I order the syrup of the bromide of morphine alone, or combine it with bromide of strychnine.

These new points of practice are well deserving of the consideration of the profession, and a little familiarity with their application will, I feel confident, repay the trouble of subjecting them to the proof derived from experience. Another point of practice is also worthy of notice. In one severe instance of intermittency with palpitation, where morphia could not be tolerated, owing to the nausea and after depression it produced, and where quick relief was demanded, it occurred to me to apply a blister over the whole of the front part of the neck (the throat), so as indirectly to influence the sympathetics. The effect in this case was simply immediate for good. So soon as the counter-irritation began to be felt, the action of the heart became quieter, the intermittency was reduced, and sleep, which had for several nights been absent, became the welcome visitor. In a second case a sinapism applied to the throat was instantly beneficial. "I passed," said the patient, "as the sinapism took effect, from incessant restlessness, owing to the irregular action of the heart, into deep sleep, and that so insensibly and rapidly I was not conscious of going to sleep."

In both these instances the intermittency of the heart has not been renewed for several weeks, and the result of the practice is, as far as it goes, extremely hopeful. I shall be inclined, in the next intractable case that presents itself to me, to keep up counter-irritation, if necessary, for some length of time, either by repeating the process of blistering, or by the introduction of a seton, the good effects of which, as a remedy in cases of irregular nervous action, though well known to our forefathers in physic, is in these days almost unrecognized. Irritation by Faradization might also be applied with prospect of good result.

had palpitation when his pulse was quite steady and slow." As I doubted the correctness of his observation—for he was the subject of intermittent pulse—he one day rode up to me at my house, "Now," said he, "I have unbearable palpitation; you can see it through my clothes, and it makes me feel faint, but it is distinct from the intermittent action of my heart, and from the actions of my heart or pulse at the wrist, as you will find." His observation was accurate: his heart beat seventy-four times a minute, with intermittent action every twenty-sixth stroke, but the motion of the heart, nevertheless, was tranquil and entirely distinct from the rapid vehement palpitation. The palpitation was from some pulsating action immediately below the heart; it was epigastric, and had no relation to motion of the heart.

I have, since this case, very often examined the chest in other persons during palpitation, and found the same fact—viz., tumultuous action or fluttering felt as if within the chest, without any actual disturbance in the motion of the heart. This palpitation is usually accompanied with a sense of fulness in the throat, and is relieved by the eructation of flatus, or by the passage of gas along the small intestines into the colon. The pulsation can be felt by the observer very distinctly, and it can also be heard through the stethoscope, but not always in exactly the same place. It is usually most distinctly heard in the epigastric region, centrally, a little below the lower point of the sternum; it consists of a series of quick throbs, very full and bounding, sometimes with faint murmur. In my first communication on this symptom I thought it was due to a tremulous rapid movement in some of the fibres of the diaphragm, but further experience has proved to me that the pulsation is really vascular, and that it is due to motion in some of the large vessels which proceed from the aorta to feed the abdominal viscera, such as the cœliac axis. It is as if the nervous supply to the vessel were rendered in an irregular or disturbed manner, and that the vessel underwent a rapid series of contractile movements, independently of the cardiac movements. Epigastric palpitation is rarely prolonged, and, although it is painfully disagreeable, it is not alone of serious moment. It is less commonly connected with intermittent action of the heart than is the true cardiac palpitation.

The treatment of that form of palpitation in which the motion of the heart itself is involved, is the same as that which holds good for intermittent action. The palpitation which may be called epigastric, is also properly treated on similar principles; but when it is present, it is more important to attend to the digestive functions, to administer an alterative aperient, or an alkaline bitter, if there be acidity, or a mineral acid—nitro-hydrochloric—if there be inactivity of hepatic function. When the symptom is connected with anæmia, with want of muscular tone, and with deficient action of the bowels from feebleness of muscular power, the Syrup of the Superphosphate of Iron, Quinine, and Strychnine, is, with an occasional alterative, the best of all medicinal aids to cure.

CHAPTER VIII.

ADDENDUM ON TREATMENT.

While this essay has been preparing for publication, two or three extreme cases of intermittent action of the heart have come under my care, to relieve which I have adopted, with considerable success, some new remedial measures. This modification of treatment has led, indeed, to the introduction into medicine of one or two new medicinal compounds, viz., the bromides of quinine, morphine, and strychnine. These bromides are made by the action of hydrobromic acid on the alkaloids, and they are prescribed in the form of syrup. I prescribe in each fluid drachm of simple syrup, one grain of the bromide of quinine, one-eighth of a grain of morphia, or one thirty-second of a grain of strychnine, and I thus make the fluid drachm the single dose. In some cases I prescribe these remedies alone, in other cases I combine them, retaining the same dose of each in the combination. In cases where there is much general debility, irritability, and sleeplessness, I know of no remedy that answers so well as the syrup of the bromide of quinine and morphine. A drachm may be administered every three hours until rest is obtained, and when the effect of the medicine becomes pronounced the quietude of the heart is almost invariably secured. In cases where there is persistent debility and little excitability I prescribe the syrup of the bromide of quinine and strychnine, in drachm doses, three times a day, withholding the morphine, if there be little irritability and restlessness, or adding it, in place of the strychnine, should those symptoms arise. In other cases, where quinine is not wanted, or is not readily tolerated, I order the syrup of the bromide of morphine alone, or combine it with bromide of strychnine.

These new points of practice are well deserving of the consideration of the profession, and a little familiarity with their application will, I feel confident, repay the trouble of subjecting them to the proof derived from experience. Another point of practice is also worthy of notice. In one severe instance of intermittency with palpitation, where morphia could not be tolerated, owing to the nausea and after depression it produced, and where quick relief was demanded, it occurred to me to apply a blister over the whole of the front part of the neck (the throat), so as indirectly to influence the sympathetics. The effect in this case was simply immediate for good. So soon as the counter-irritation began to be felt, the action of the heart became quieter, the intermittency was reduced, and sleep, which had for several nights been absent, became the welcome visitor. In a second case a sinapism applied to the throat was instantly beneficial. "I passed," said the patient, "as the sinapism took effect, from incessant restlessness, owing to the irregular action of the heart, into deep sleep, and that so insensibly and rapidly I was not conscious of going to sleep."

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